FEBRUARY, 1946

Railway Engineering and Maintenance

IMPROVED HIPOWERS
IMPROVE TRACK

NATIONAL LOCK WASHER COMPANY, NEWARK, N. J., U.S.A.

heavy tonnage

rolling smoothly in and out of America's Ruhr Valley

NEW FAMOUS TRAINS OF AMERICA

Modern B and O freight trains speeding thru Sir Johns Run, West Virginia.

Heavy freight going places at high speed needs safe trouble-free track.

Reliance Hy-Pressure Hy-Crome Spring Washers help keep rail joint assemblies tight and under constant tension, compensating for inevitable looseness resulting from wear . . . thus maintaining a safe dependable track.

Reliance Hy-Pressure Hy-Crome Spring Washers have that inherent reactive pressure to hold correct bolt tension under all conditions. Heavy loads at fast speeds over rail joints necessitate a tight rail joint assembly. Reliance Hy-Pressure Hy-Crome Spring Washers take up the slack, and hold the rail joints secure at assembly points. Then the right-of-way needs fewer repair gangs, and today's heavy tonnage gets a highball, day in — day out. That's why more and more railroad maintenance men are specifying Reliance Hy-Pressure Hy-Crome Spring Washers for vital track assembly joints.

Edgemark of Quality

EATON

EATON MANUFACTURING COMPANY

MASSILLON, OHIO

Write today for folder on Reliance Hy-Pressure Hy-Crome Spring Washers for track applications and see for yourself how the Reliance Hy-Crome Spring Washer family can help give you trouble-free track.

Reliance Division

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

The Toughie

WITH A VELVET TOUCH

Take a look at that sturdy mass of steel. It's Bethlehem's Hook-Flange Guard Rail. The first thing that strikes you is its ruggedness. Looks as if it could shed a blow and hardly feel it.

That's a point that the years have proved. So far as we know, there has never been one of these guard rails that has broken under traffic. But for all its sturdiness, the guard has a cushioning effect that eases wheels gently into line.

The tapered-end construction tells the story. Wheels seldom hit it with a sharp, jarring crash. They line up smoothly, rolling into position with a minimum of shock. The chances of cracked, chipped, or broken flanges are therefore greatly reduced.

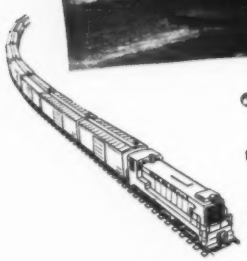
But there are other practical features, too. Note how the hook flange passes under the base of the running rail, so that the weight of the train keeps the guard rail from overturning. And note the special tie plates, shouldered against the guard rail to prevent lateral movement.

Ask a Bethlehem man for full details. He'll be glad to point out where this husky device can fit into your main-line track . . . classification yards . . . or slips and crossings.

BETHLEHEM STEEL

★ Bethlehem Hook-Flange Guard Rail ★

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00; Foreign $3.00. Single copies 35 cents. Entered as second-class matter January 20, 1933 at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.



This new Diesel-electric rates DULUX for long-life protection

THROUGHOUT THE RAILROAD INDUSTRY, in manufacturing plants and maintenance shops, Du Pont DULUX is back at work—doing a better job than ever of saving finishing dollars. This saving comes through the ease of application and quality of results possible with DULUX; through the extra service and better appearance that this outstanding finish gives locomotives, passenger and freight cars, and signal equipment. DULUX is tough and adhesive, resistant to continuous outdoor exposure and grinding dust. As proved over a period of years, DULUX gives superior protection at lower cost per mile. Check with your local distributor for availability.

E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.

DEPEND ON DU PONT FOR BETTER FINISHES

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

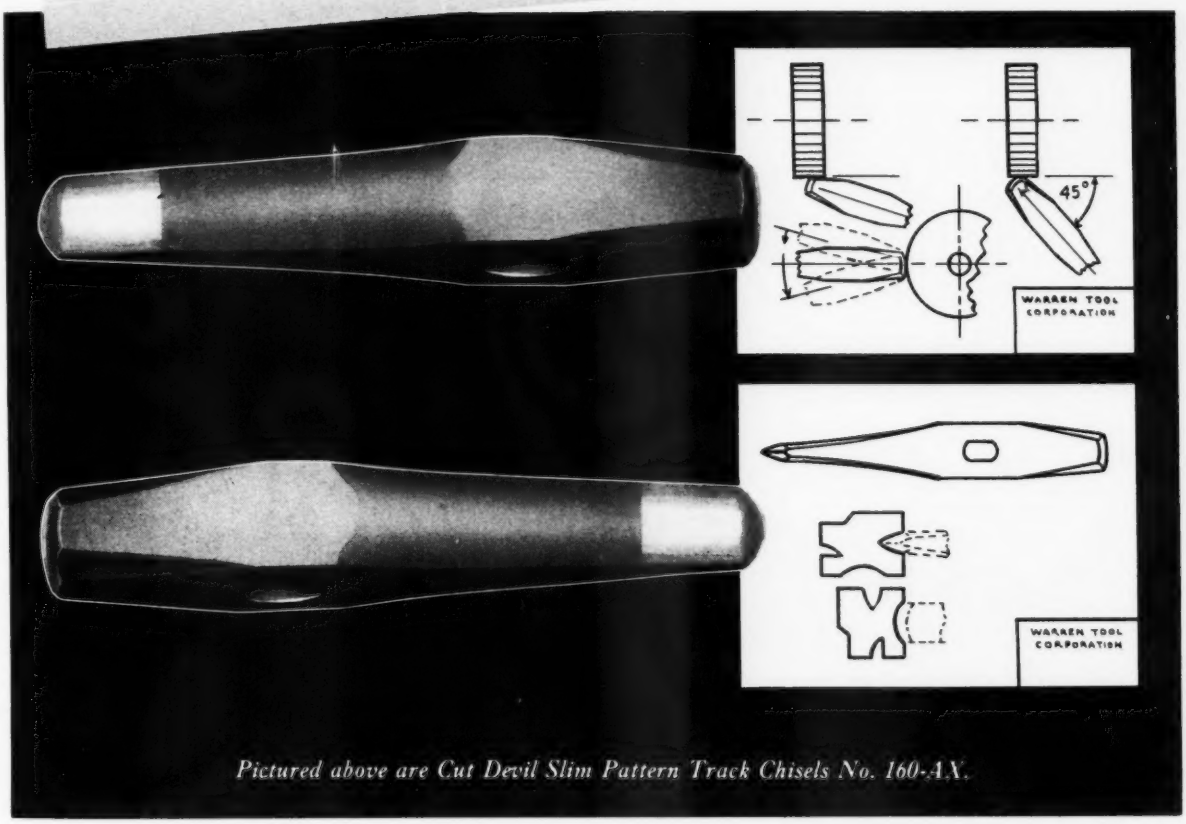
a requisition for

SAFETY...

is a requisition for

WARREN TOOLS

also... If you were to select a motto for the Devil Line of Warren tools, "Safety in Use" would be most appropriate. Warren backs up this motto with tool quality... furthermore, Warren will furnish you with Van Dyke prints for the proper care of tools—put copies of the prints on the walls where they will be seen and used. They promote "safety." Remember, too, "Service and Safety" is the basis for Warren production—all along the line from selection of electric furnace alloy tool steel to heat treating and grinding. *Write today for prints.*



Pictured above are Cut Devil Slim Pattern Track Chisels No. 160-AX.

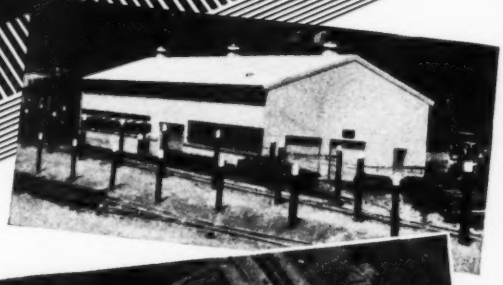
DEVIL TOOLS

WARREN TOOL CORP. • WARREN, OHIO

GENERAL SALES OFFICES
105 W. Adams St., Chicago

FACTORY: GRISWOLD ST.
WARREN, OHIO

For Double Protection Against Rust Use ZINC!



Says the U. S. Bureau of Standards, in Cir. No. 80, "by far the best protective metallic coating for rust-proofing iron or steel" is ZINC.

That statement has been true for over a hundred years, and is likely to be true for a long time yet.

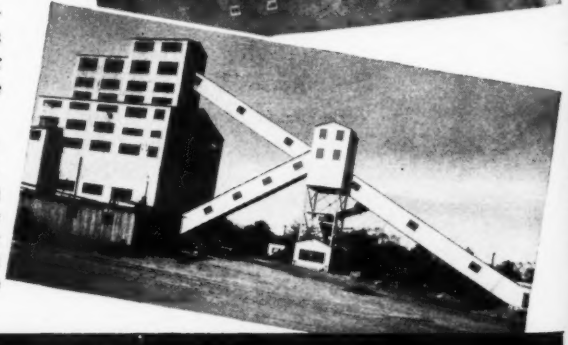
Zinc in the form of a coating protects against rust in two ways:

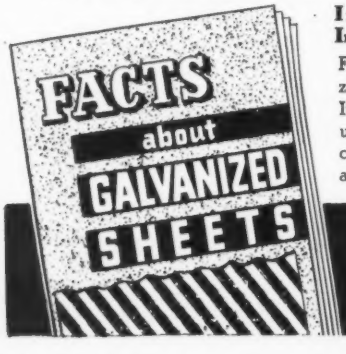
First, by simple coverage, with a sheath of rust-resistant metal.

Second, by electro-chemical action, or "sacrificial corrosion"

Stop Rust! Cut Costs! Save Materials! . . . with ZINC!

Buildings, equipment, machinery — in all of them the use of zinc for protection against rust is good engineering and sensible economy. Zinc can be applied by hot-dip galvanizing, electro-plating, sherardizing, or as a metallic pigment; all these methods are sound and practical for various applications... And specify *heavy* coatings, for the heavier the zinc coating, the better the protection, the longer the service life, and the lower the cost.





Interesting and Valuable Information About ZINC

For practical information about zinc, read the booklets the Zinc Institute has prepared for your use. You can get them without charge by sending us your name and address: a postal will do.

American Zinc Institute
INCORPORATED
60 East 42nd Street, New York 17, N.Y.

EIGHT NORTHWESTS for the C. P. R.!

Another Northwest makes eight for the Canadian Pacific R. R. When you are planning and thinking about what Shovel, Crane, Dragline or Pullshovel is going to help you cut costs and speed up maintenance of way operations, in those years of expansion and modernization ahead, remember that Northwests are serving on most of the Class 1 railroads and that one out of every three Northwests is a repeat order in the hands of leading companies like the C. P. R.

There *is* no better testimonial to quality and performance possible.

NORTHWEST ENGINEERING CO.
1713 Steger Building • 28 E. Jackson Boulevard
Chicago 4, Illinois

DON'T RISK CATTLE CLAIMS!

Kill Weeds Chemically without Danger of Killing Cattle

ATLACIDE Chlorate Weed Killer is again available for railroad requirements. This product has long had top rating for its effectiveness, especially in the control of tough perennial grasses. It also has the distinct advantage of being non-poisonous to grazing animals.

With the return of normal supplies, we can again assure the most efficient weed killing with safety. Our Atlacide application contracts guarantee protection for the railroad against cattle claims.

ATLAS "A" Arsenical Weed Killer is still being used with good effect where condition of vegetation permits, and where lack of exposure to cattle allows the use of a poisonous material.

We are always glad to work out a program for the use of weed control chemicals to achieve the best results at the lowest possible cost. For your weed control program use products proved effective by years of railroad application.

CHIPMAN
2,4-D WEED KILLER
(For Selective Weed Control)

CHIPMAN
CHLORAX WEED KILLER
(For Fire Protection around Poles and Trestles)

CHIPMAN CHEMICAL COMPANY, INC.

Chicago, Ill. · BOUND BROOK, NEW JERSEY · Portland, Ore.

Houston, Texas · Palo Alto, Calif. · No. Kansas City, Mo. · Winnipeg, Man.

Over Twenty-five Years of Weed Control Service

EASY GOING!

Thor

PNEUMATIC GRINDERS AND SANDERS

Remove More Metal . . . Faster

You get steady power and speed plus smooth operation in Thor Pneumatic Grinders and Sanders because advanced design provides positive air control. Thor puts air constantly *behind* the wider blades in Thor's one-piece, dynamically-balanced rotor—to assure instant starting and steady power. A quick-acting automatic governor controls rotor speed at all loads. An "over-size" spindle, ball-bearing mounted, prevents spindle-whip and vibration.

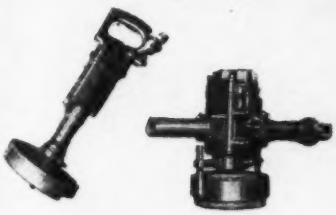
These features mean easier operation and dependable performance that speed grinding jobs. A demonstration will convince you—ask for one now.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles Milwaukee New York Philadelphia
Pittsburgh St. Louis Salt Lake City San Francisco Toronto, Canada London, England

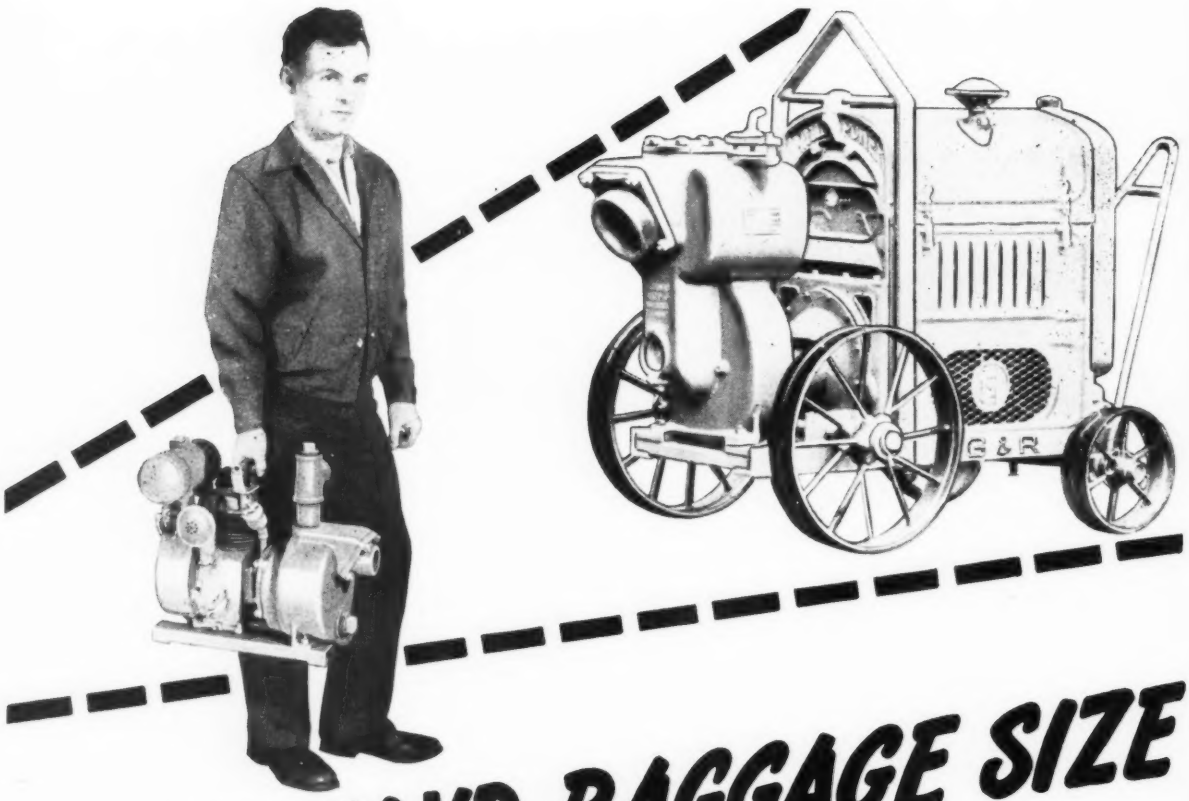
TOOL FOR EVERY JOB!



Thor portable pneumatic grinders and sanders are available in sizes and models to take from tiny mounted points up to 8" dia. wheels. All sizes are carefully graduated as to weights, lengths, speeds and capacities. For full specifications, ask for Catalog No. 52B.

Thor **PORTABLE POWER TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS



FROM HAND-BAGGAGE SIZE . . . ON UP!

GORMAN-RUPP PUMPS WILL FIT YOUR JOB

You may want a pump as small and easy to carry as a bag of tools – Gorman-Rupp has such a pump that will deliver as much as 3,000 gallons per hour. Or, you may have a heavy de-watering job that calls for as much as 125,000 gallons per hour at continuous operation. Whatever the size or application – get one of those dependable, Gorman-Rupp BLUE pumps!

If you want a self-priming, centrifugal pump that never has to be shut down to be cleaned out get a dependable Gorman-Rupp BLUE pump, which has no recirculation orifice to get plugged or control valve to get jammed.

For size, for weight, for power, for cost – Gorman-Rupp self-priming centrifugal pumps can't be matched! Our nearest distributor will send you one and let you be the judge. If it doesn't do a better pump job than any other you have seen, return it at our expense – and it won't cost you a cent!

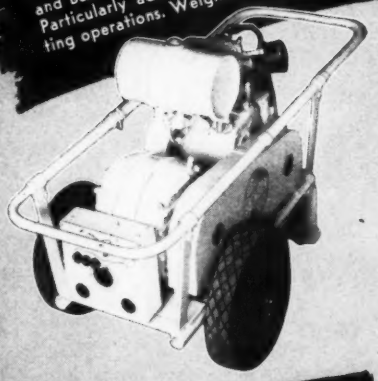
GORMAN-RUPP PUMPS — UNSURPASSED FOR PUMPING FAST — ARMY NAVY

THE GORMAN-RUPP COMPANY

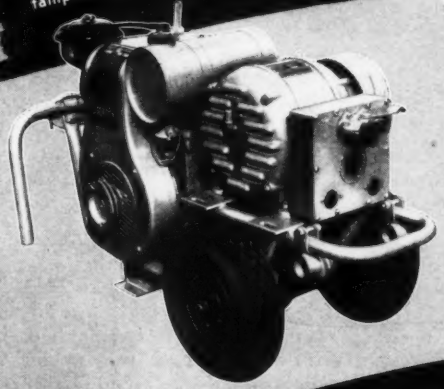
M A N S F I E L D • O H I O

Continuous DAY IN *and* DAY OUT *Dependability*

JACKSON MODEL M-1
1.25 K.V.A., continuous duty. Operates 2 JACKSON Tampers, or lights and B&B tools to full rated capacity. Particularly advantageous for spotting operations. Weighs only 243 lbs.



JACKSON MODEL M-2
2.5 K.V.A., continuous duty. Operates 4 JACKSON Tampers, or lights and B&B tools to full rated capacity. Two of these units are ideal for an 8-tamper organization. Easily portable.



SUCH AS NO PORTABLE POWER PLANTS *EVER BEFORE POSSESSED*

Time out and crew "hold-ups" due to generator troubles or necessary adjustments are a thing of the past for all those using the new JACKSON Portable Power Plants, for all models are equipped with

★ **PERMANENT MAGNET GENERATORS**

★ Which require no maintenance other than two ball bearings running in oil.

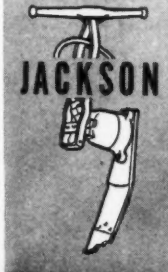
★ Require no adjustments whatsoever.

★ Have less than 1/6 the parts contained in the conventional generator.

★ Are practically TROUBLE-PROOF.

★ AND DELIVER BOTH SINGLE PHASE AND 3 PHASE 60 CYCLE, 115 VOLT A.C. TO THEIR FULL RATED CAPACITIES.

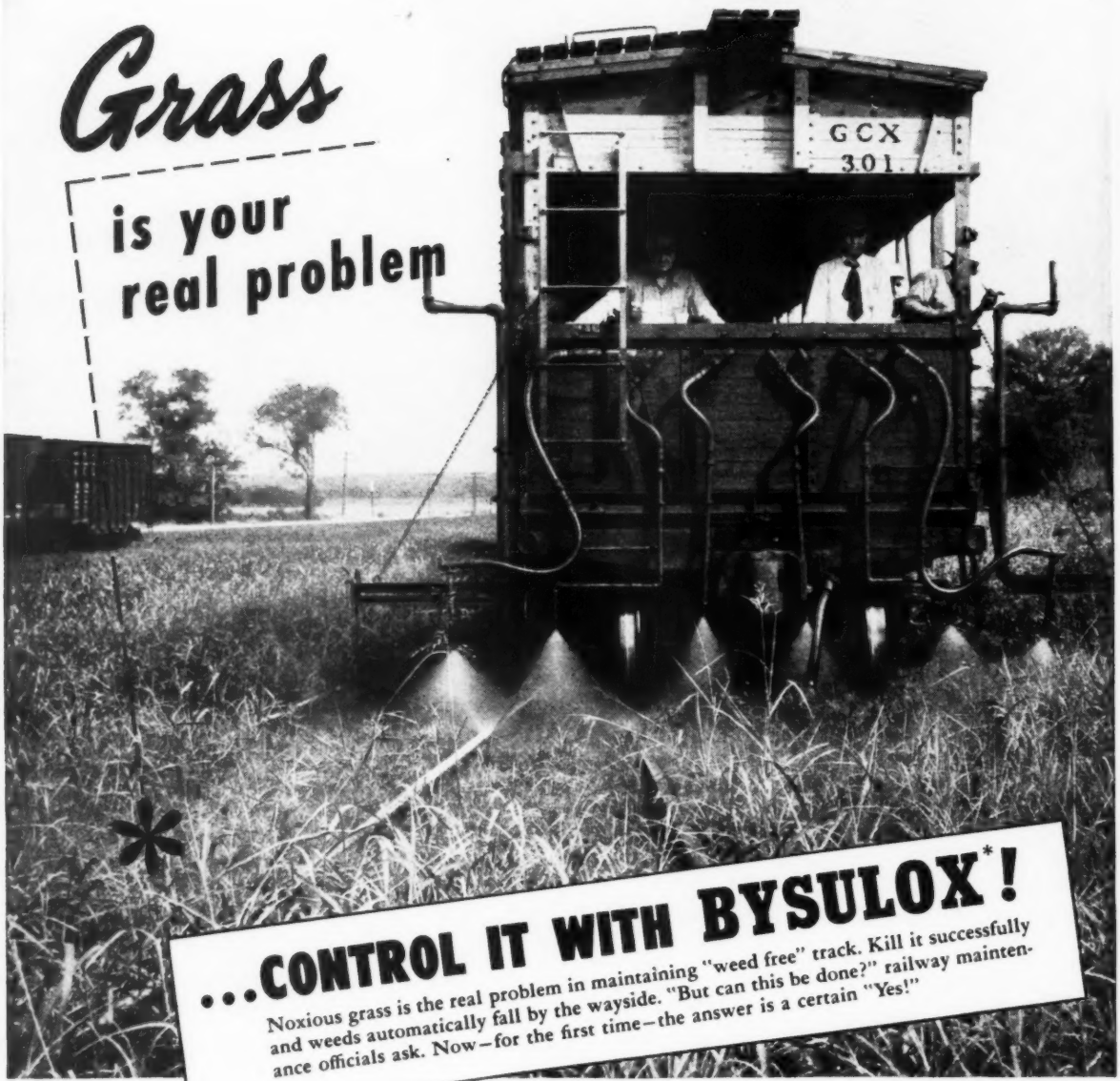
Add to this the fact that they incorporate the most reliable of engines and typical JACKSON quality construction throughout, and you have DEPENDABILITY **such as no other Power Plants have ever before possessed** — the ideal source of power for operating 2, 4, 8 and 12 tamper outfits, a wide range of B & B tools and lights. Get the facts. Write NOW!



JACKSON MODEL M-4
5 K.V.A., continuous duty. 7.5 K.V.A. intermittent. Operates 12 JACKSON Tampers, or lights and B&B tools to full rated capacity. 4 telescoping handles, standard auto tires and rail-riding wheel make even this largest model easily maneuverable.

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan

Grass is your real problem



...CONTROL IT WITH BYSULOX*!

Noxious grass is the real problem in maintaining "weed free" track. Kill it successfully and weeds automatically fall by the wayside. "But can this be done?" railway maintenance officials ask. Now—for the first time—the answer is a certain "Yes!"

*REG. U. S. PAT. OFF.

Success Now Purchasable

The Method: Properly planned applications of General Chemical Bysulox "A" and "C" chemicals have successfully controlled long-established infestations of such noxious grasses as Horsetail, Quack grass, Johnson and Bermuda grasses! That's because these unique developments of General Chemical Research are not ordinary "weed killers"... because their chemical formulation is based on an entirely new principle of control.

BYSULOX KILLS GRASS

Perfect Hazard Record!

Thousands of miles of track have been treated with these new Bysulox chemicals over a three-year period, yet not one case of livestock poisoning has been reported.

Planned Service

General Chemical's Railroad Service provides the most advanced type of Spray Train operated by highly trained supervisors using the latest techniques in chemical application. With this program, spray operations are continuous and automatic. No mixing of chemicals is necessary at water towers, and work crews are held to a minimum.

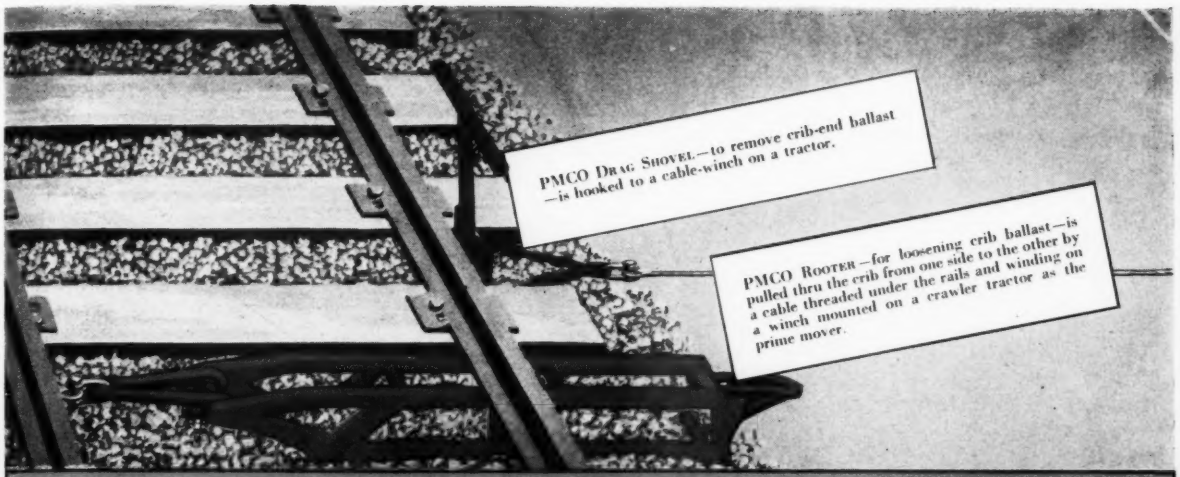
The Company will gladly assist railroads in developing 1946 weed control programs which are individually and properly planned for areas to be treated. All recommendations are based on thorough track inspection with regional and divisional statistical cost analyses.

With such a program you can get the grass ... so plan on Bysulox for 1946. For consultation and planned service, write:

GENERAL CHEMICAL COMPANY

Weed Killer Division

40 Rector Street, New York 6, N. Y.


PMCO Drag Shovel—to remove crib-end ballast—is hooked to a cable-winch on a tractor.
PMCO Rooter—for loosening crib ballast—is pulled thru the crib from one side to the other by a cable threaded under the rails and winding on a winch mounted on a crawler tractor as the prime mover.

APPLY MODERN EARTH MOVING METHODS IN SKELETONIZING TRACK

The New

PETTIBONE MULLIKEN CRIBBING SET

ROOTER • DRAG BUCKET • DRAG SHOVEL

Saves $1,000 *per mile*

$100,000 *per* 100 *miles*

Eliminates (pick and shovel) hand methods
Eliminates monotony and drudgery of hand cribbing
Maintains satisfied crews
Speeds up skeletonizing 500%

Write Today for Bulletin No. 1500

"Quality Since 1880"

PETTIBONE MULLIKEN CORPORATION

4710 West Division Street, Chicago 51, Illinois

Faster and Better Maintenance

MANY urgent railroad maintenance problems are being solved quickly and economically by Airco's modern metal-working processes. For example, Airco re-building methods swiftly restore battered rail ends, worn switch points and frogs to excellent condition, at surprisingly low cost and with minimum interruption to traffic. Other Airco methods simplify maintenance of railroad structures such as stations, bridges, and signal towers, as well as track tools and equipment.

These versatile methods not only save time and cost but, in many cases, they add years to the service life of the equipment or structures. Airco's Technical Railroad Sales Division will gladly give full information or technical aid on any use of these processes. For complete details, write any Airco office or Dept. REM at the New York address.

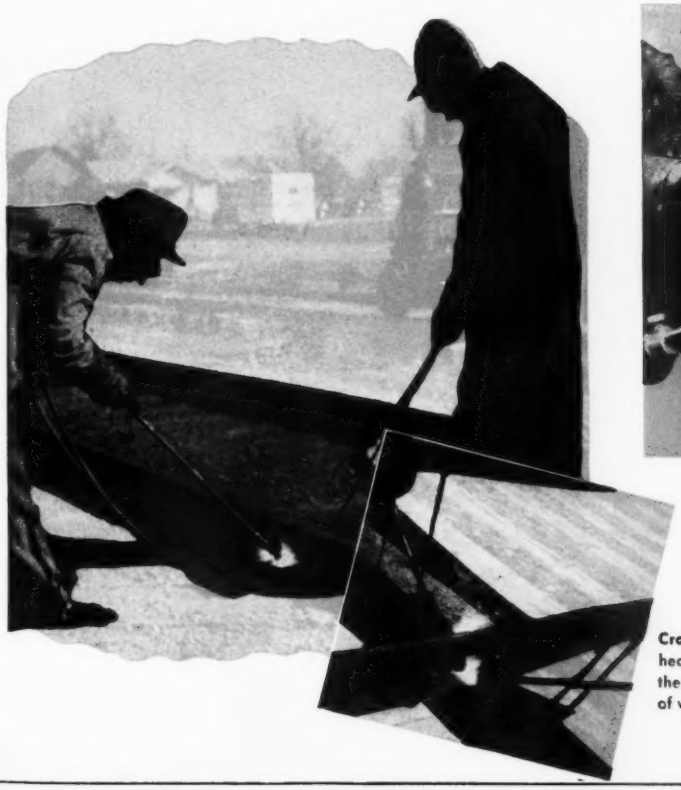
Flame Cleaning and Dehydrating is the fast, efficient method of preparing metal surfaces for painting. It quickly loosens scale and rust to permit their easy removal. The clean warm surface makes paint cling closer, last longer. Note the results in the inset photo. Airco supplies tips for cleaning flat or irregular surfaces.

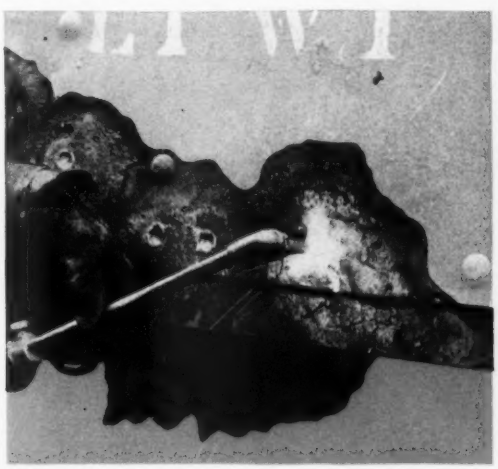
AIRCO

with Modern Airco Processes

Butt Welding by the oxyacetylene method eliminates much of the maintenance necessary on jointed rails. It may be performed either in or out of traffic. This method is economical in application and in maintenance savings.

Arc Welding is another Airco process of proven value to maintenance men. Here a reinforcing plate is being welded onto an I-beam with the electric arc.





Rivet Washing with Airco oxyacetylene cutting torches is fast and economical. Airco Style 144 tip is used to "wash out" the rivet head, then pierce the rivet shank so that it can be dislodged easily with a rivet hammer.

Crowning Angle Bars by the use of Airco oxyacetylene heating torches takes the dip out of the bars, raises them to normal position, and thus reduces the length of welding needed to restore a uniform rail end surface.

AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

Offices in all Principal Cities

Represented Internationally by Airco Export Corporation

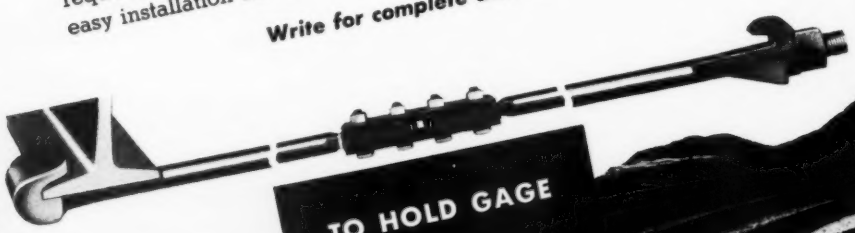
A dependable source of Track Economies . . .

OLIVER GAGE RODS

By firmly tying both rails together as a single unit, Oliver Gage Rods provide a worthwhile source of track economies. They prevent rail movement, reduce regaging and extend the life of ties.

Oliver Gage Rods are manufactured in styles to suit various requirements and conditions. They are designed and made for easy installation and long life.

Write for complete details.



TO HOLD GAGE

—on stiff curves
—at main switches
—near crossings
—wherever service is severe

FORGED RAIL HOOK

BENT RAIL HOOK

END RAIL JAW

CENTER INSULATION

OLIVER
IRON AND STEEL
Corporation

SOUTH TENTH AND MURIEL STREETS · PITTSBURGH 3, PENNSYLVANIA

50 Ton Load!...Operator is SAFE with Orton

COMPRESSION BRAKING

All Orton Diesel Cranes are equipped with a 3-speed *and reverse* transmission, located just behind the engine to control the speeds of *all* operations of the crane. When lowering a *heavy load*, the transmission is put in reverse and the load is lowered against compression of the engine exactly as you brake your car going down hill in second gear.

Just as in your car, the compression of the engine keeps the load from running away, with no possibility of dropping it. Fine control is secured with the friction brake, *which gives fine control only*, and is not relied upon for the safe holding of the load.

LOAD IS LOWERED AGAINST COMPRESSION OF ENGINE EXACTLY AS YOU BRAKE YOUR CAR GOING DOWN HILL IN SECOND GEAR

Compression braking is the Orton invention which made the Diesel crane *practical* for handling heavy loads. *Send for Orton Catalog No. 77 giving detailed description.*

NOW A DIESEL CRANE IS *SAFE*

ORTON CRANE & SHOVEL CO.

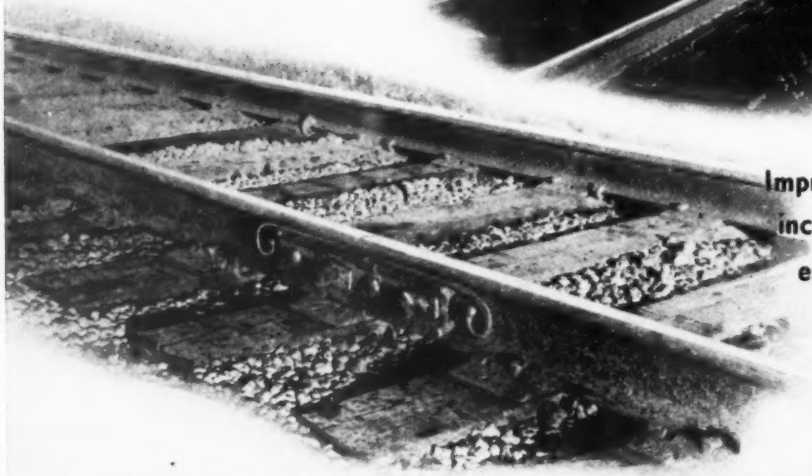
608 SOUTH DEARBORN STREET • CHICAGO 5, ILLINOIS • OFFICES IN PRINCIPAL CITIES

STREAMLINED TRACK

the Shape of Things to Come

More economical distribution of metal

Increase in torsional rigidity



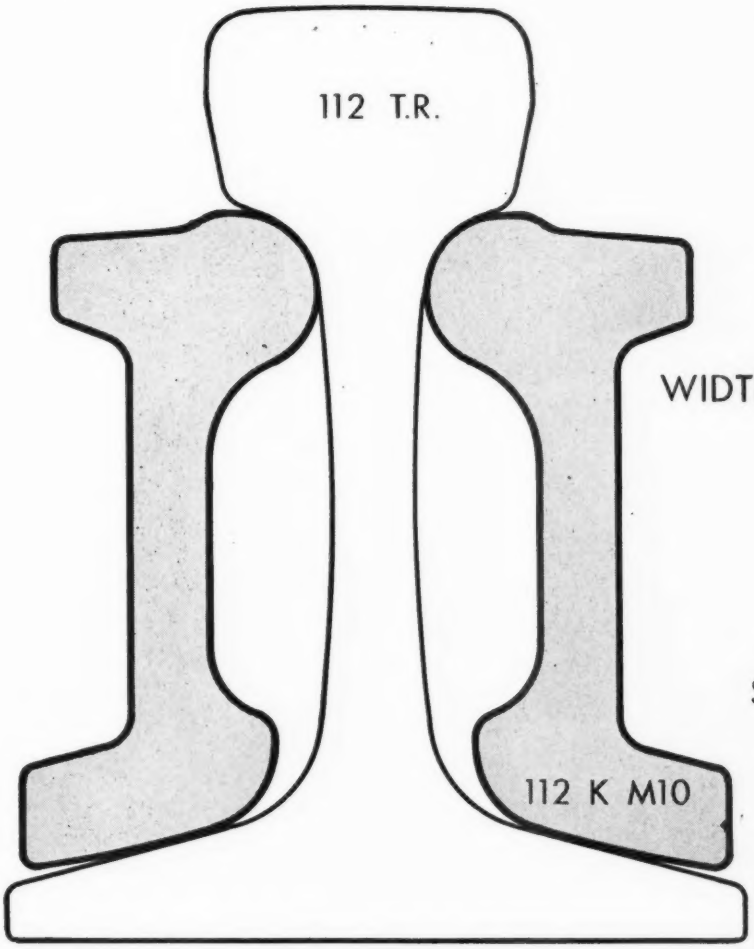
Improved rail end condition with increased life at joint bars afforded by enlarged rail head-web connecting fille

A stronger assembly at the railends

Stresses, resulting from lateral and eccentric load materially reduced in upper rail web and fillet

THE RAIL JOINT CO

TORSION RESISTING RAIL WITH IMPROVED HEADFREE JOINT



RAIL
I.67.0
S.M. T.17.9
B.22.3
HEIGHT — 6¾"
WIDTH OF BASE 5½"

JOINT
I.23.9
S.M. T.10.8
B. 9.8

JOINT BARS as illustrated in the above assembly were applied to the 30 miles of 112# TORSION RESISTING RAIL installed on the C. B. & Q. R. R. Photographs on opposite page, taken in October 1945, show the excellent line and surface of this rail. In addition to the high speed, frequent passenger service, approximately 36,750,000 tons of freight have passed over this rail since it was laid in August 1943.

MPANY, INC. 50 CHURCH ST. NEW YORK 7, N. Y.

AIR Does the Work

AT A TOUCH OF THE FINGERS

With MICHIGAN Fingertip Air Controls

Hour after hour—in gravel, sand, clay or rock—operators of Michigan Mobile Shovel-Cranes maintain peak production with a minimum of fatigue. Michigan's Air Controlled Clutches are fast, smooth, positive. No cumbersome levers to push and tug, no rods, toggles or joints to become stiff with grease and dirt. Michigan's Air Controls are job-proven, both in civilian and in military use . . . . Unsurpassed operating speed and truck mobility, plus real stamina and balanced design, are combined in the shovel-crane that has proven "tops" in materials-handling.

3/8 yd. and 1/2 yd. shovels—convertible to crane, clam, dragline, trench hoe. 6, 10 and 12 ton cranes.

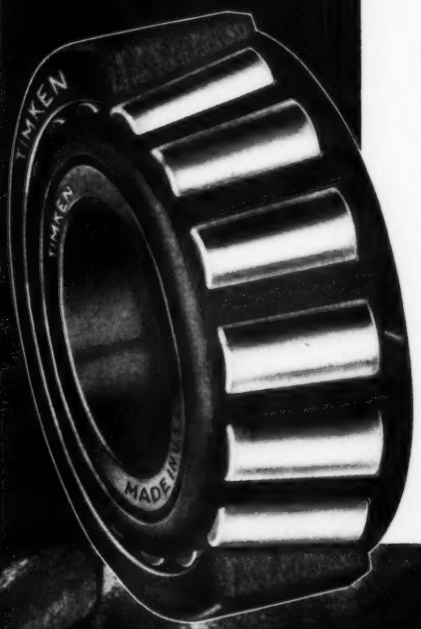
MICHIGAN

POWER SHOVEL COMPANY

BENTON HARBOR, MICHIGAN

Keep 'em out of the shop-

ON THE ROAD with TIMKEN BEARINGS

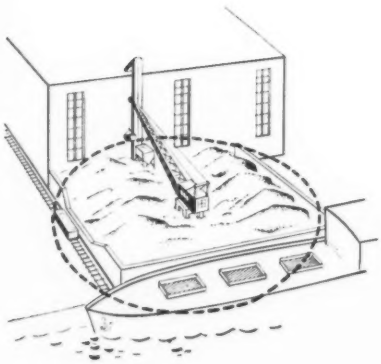


When buying new section motor cars and trailers, specify Timken Tapered Roller Bearings, the same as used in America's modern passenger cars, locomotives and streamlined trains.

Then your equipment will be ready to roll at all times, secure against the threats of friction, radial, thrust and combined loads and requiring a very minimum of attention for lubrication and general maintenance.

Make sure of getting the full benefits of Timken Bearings by looking for the trade-mark "TIMKEN" stamped on every bearing that goes in your railcars. The Timken Roller Bearing Company, Canton 6, Ohio.

STAND-IN REPLACES STAR



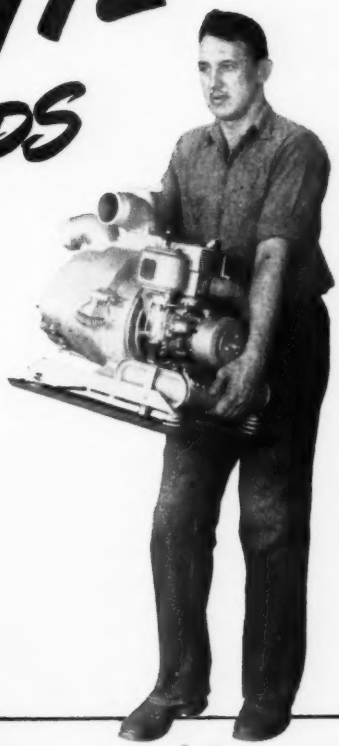
This could have happened in many plants — it might even happen in yours! An elaborate materials-handling installation was made and comparatively inexpensive stand-by equipment added for use during breakdowns. . . . But the stand-by equipment soon proved more efficient and dependable, and the expensive installation became the (rarely-ever-used) alternate.

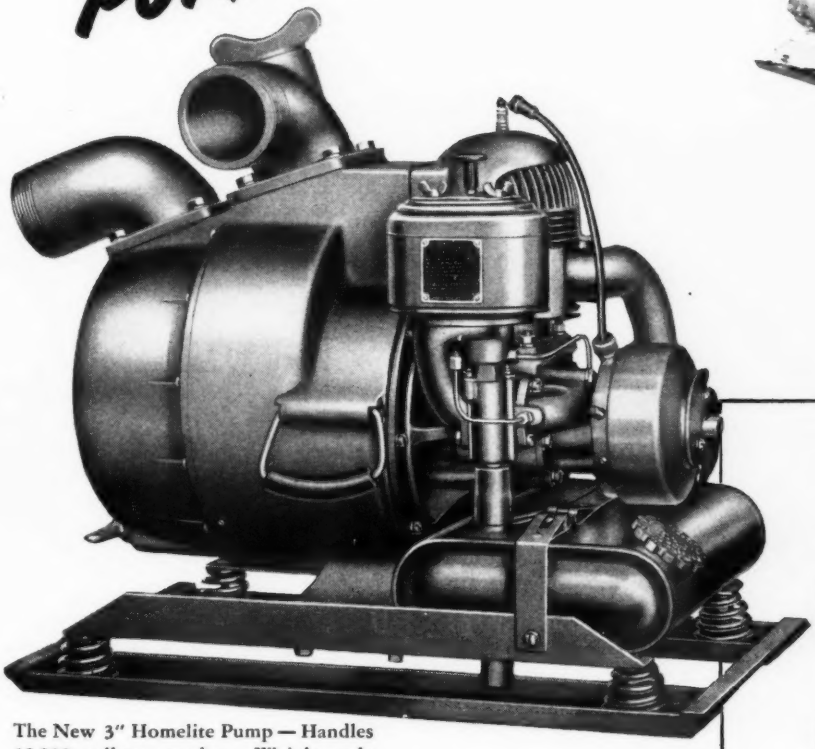
Yes, the stand-in equipment that became the star performer is an "American Revolver" Crane. This new tool for all industry surprises operating men with its efficiency. Operators know how smooth and fast it works. Never install, improve or expand materials handling facilities until you get a recommendation from "American"!

AMERICAN
HOIST & DERRICK CO.
St. Paul 1, Minnesota
CHICAGO NEW YORK SAN FRANCISCO

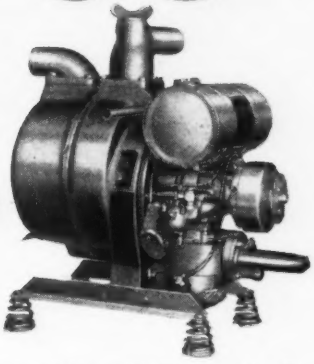
REVOLVERS LOCOMOTIVE CRANES HOISTS DERRICKS BLOCKS AND SHEAVES CROSBY CLIPS

Announcing... The New HOMELITE PORTABLE PUMPS





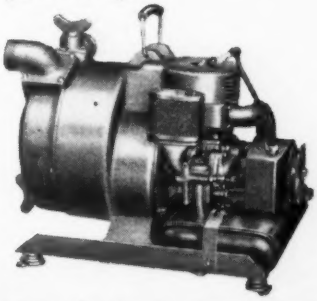
The New 3" Homelite Pump — Handles 15,000 gallons per hour. Weighs only 95 pounds complete.



The new 2" Homelite Pump — Handles 10,000 gallons per hour. Weighs only 88 pounds complete.

- **FASTER PRIMING**
- **FASTER PUMPING**
- **COMPLETELY PORTABLE**
- **BUILT-IN GASOLINE ENGINE**

Send for New Homelite Bulletin



The New 1½" Homelite Pump—Handles 3,500 gallons per hour. Weighs only 48 pounds complete.

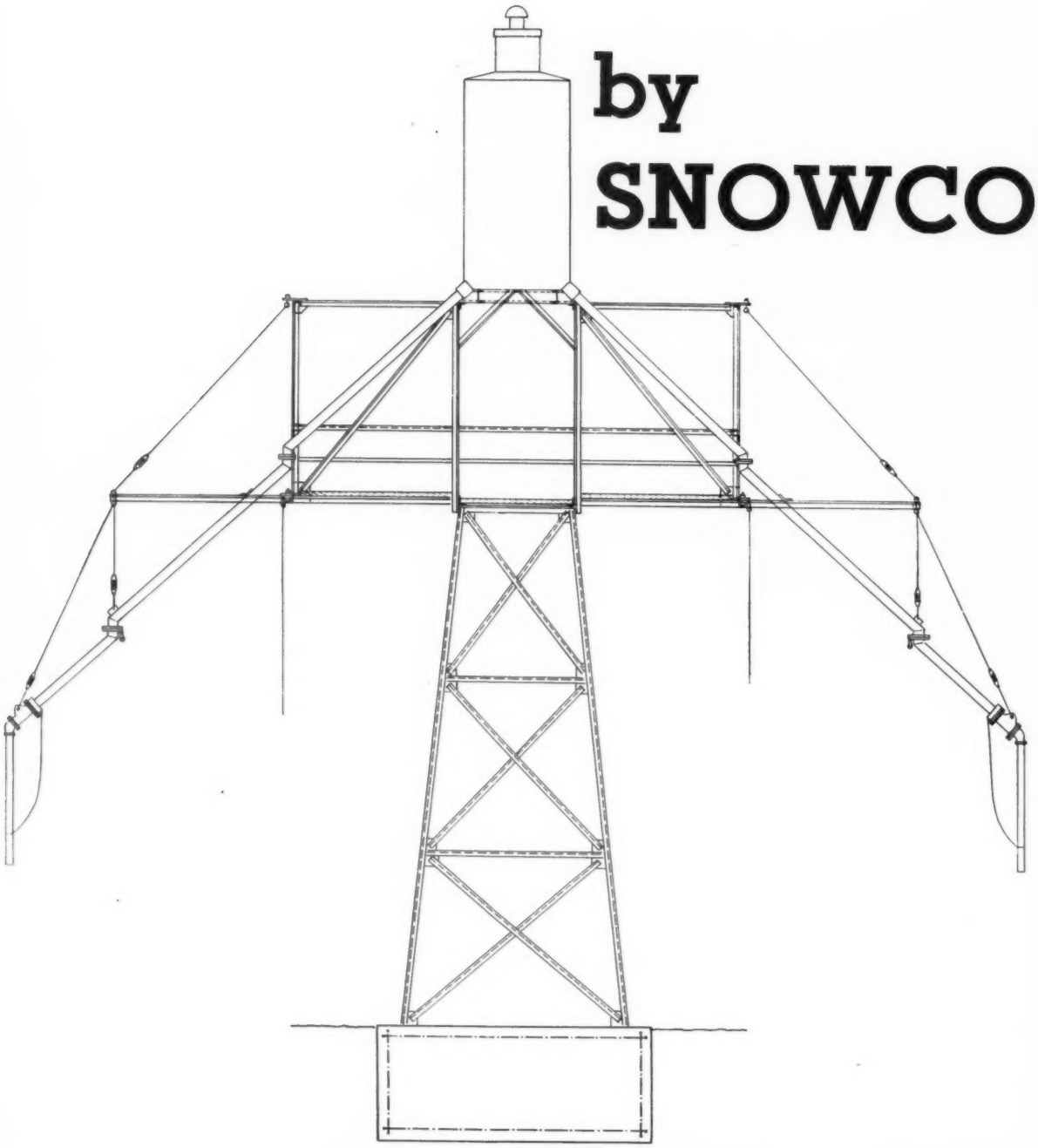
HOMELITE

Portable **CORPORATION**

PUMPS • GENERATORS • BLOWERS

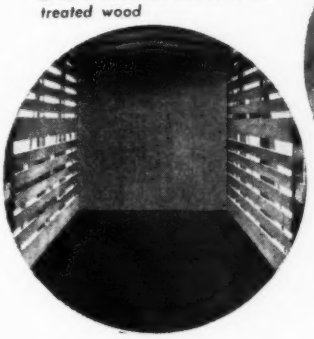
PORT CHESTER, NEW YORK, U. S. A.

by SNOWCO

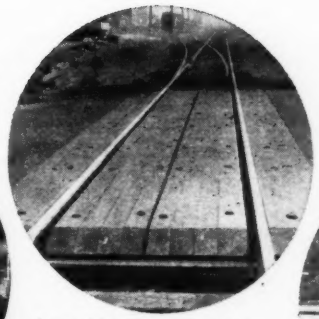


One-spot, double track diesel sanding unit using two SNOWCO spouts.

T. W. Snow Construction Co.
9 So. Clinton St. Chicago 6, Ill.



$AVINGS HERE. Users report pressure-treated car lumber gives 2 to 3 times the service of untreated wood

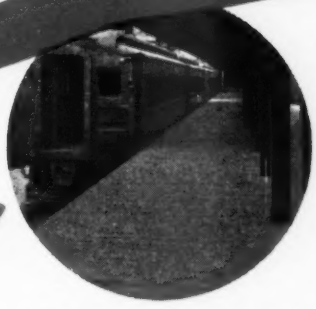


$AVINGS HERE. Creosoted timber-panel grade crossings are quickly installed, save maintenance

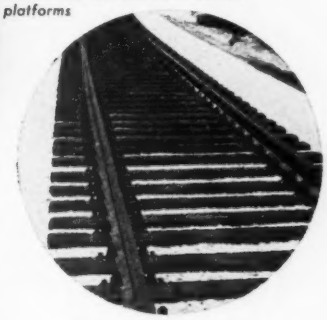
$AVINGS HERE. Pressure-treated running boards cost less than half as much per year as untreated boards.

$AVINGS HERE. This pressure-creosoted bridge cost less than 60% of the usual annual charges

HERE-some spots where PRESSURE-TREATED WOOD can save for YOU



$AVINGS HERE. Pressure-treatment, by preventing decay and increasing wearability, greatly extends the service life of station platforms



$AVINGS HERE. Service tests demonstrate that pressure-treated ties last 3 to 6 times as long as untreated ties.

With a tremendous backlog of maintenance work waiting to be done, there's never been a better chance to apply pressure-treated wood on a large scale—and make some large-scale savings.

Many railroads have already broadened their use of pressure-treated wood, and have reported remarkable economies. Pressure-treated Gondola siding and flooring lasted 14 years, where untreated material only lasted five. Treated Stock Car decking required only minor replacements after 18 years, during which untreated parts had been replaced from two to three times. Treated Running Boards lasted the entire period between roof repairs—as compared to the usual five year life obtained from untreated boards. The total annual charge for the 30 year life of Treated Bridges was only 60% of the interest charges alone on similar structures built of other permanent materials. Platforms in warehouses are still good after ten years service, while untreated materials have failed in a fraction of that time.

The question today is not "Can I afford to use pressure-treated wood?" but "Can I afford *NOT* to use it?" We will be glad to give you details on any applications you are interested in. Just write.

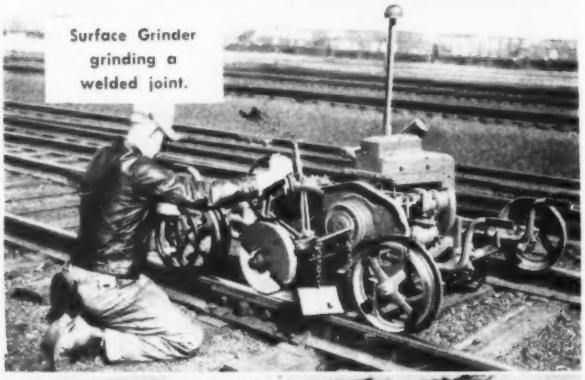
KOPPERS COMPANY, INC.—WOOD PRESERVING DIVISION

PITTSBURGH 19, PA.

KOPPERS

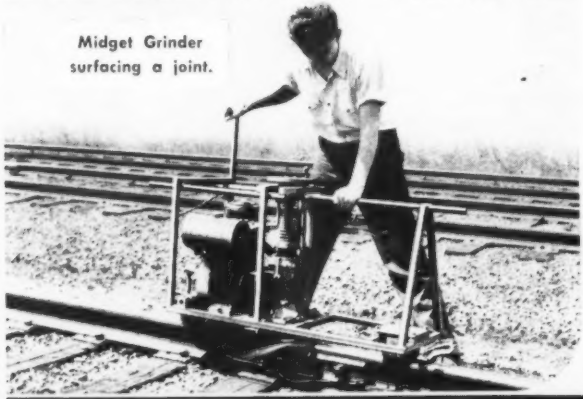
THE INDUSTRY THAT SERVES ALL INDUSTRY

Utility Grinder slotting rail ends.



Surface Grinder grinding a welded joint.

Surface Grinder grinding a frog groove.



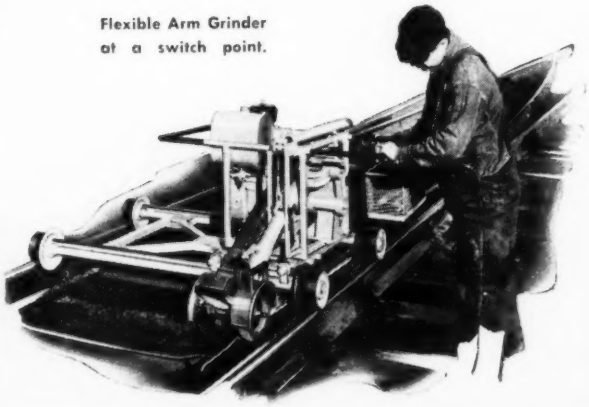
Midget Grinder surfacing a joint.

FOR YOUR RAIL GRINDING NEEDS

WITH these five Nordberg Grinders developed to meet your grinding needs, it is possible to select the proper grinder for each specialized demand. Whether it is the surfacing of reconditioned rail joints, rail end slotting, removing flow at switch points and stock rails, grinding flangeways and frogs and the many other grinding jobs encountered in the maintenance of rail, switches and crossings, there is a Nordberg Grinder that will do a better quality of work in less time and at less expense.

Write for bulletins describing these grinders which are in use on most of America's leading railroads.

Flexible Arm Grinder at a switch point.



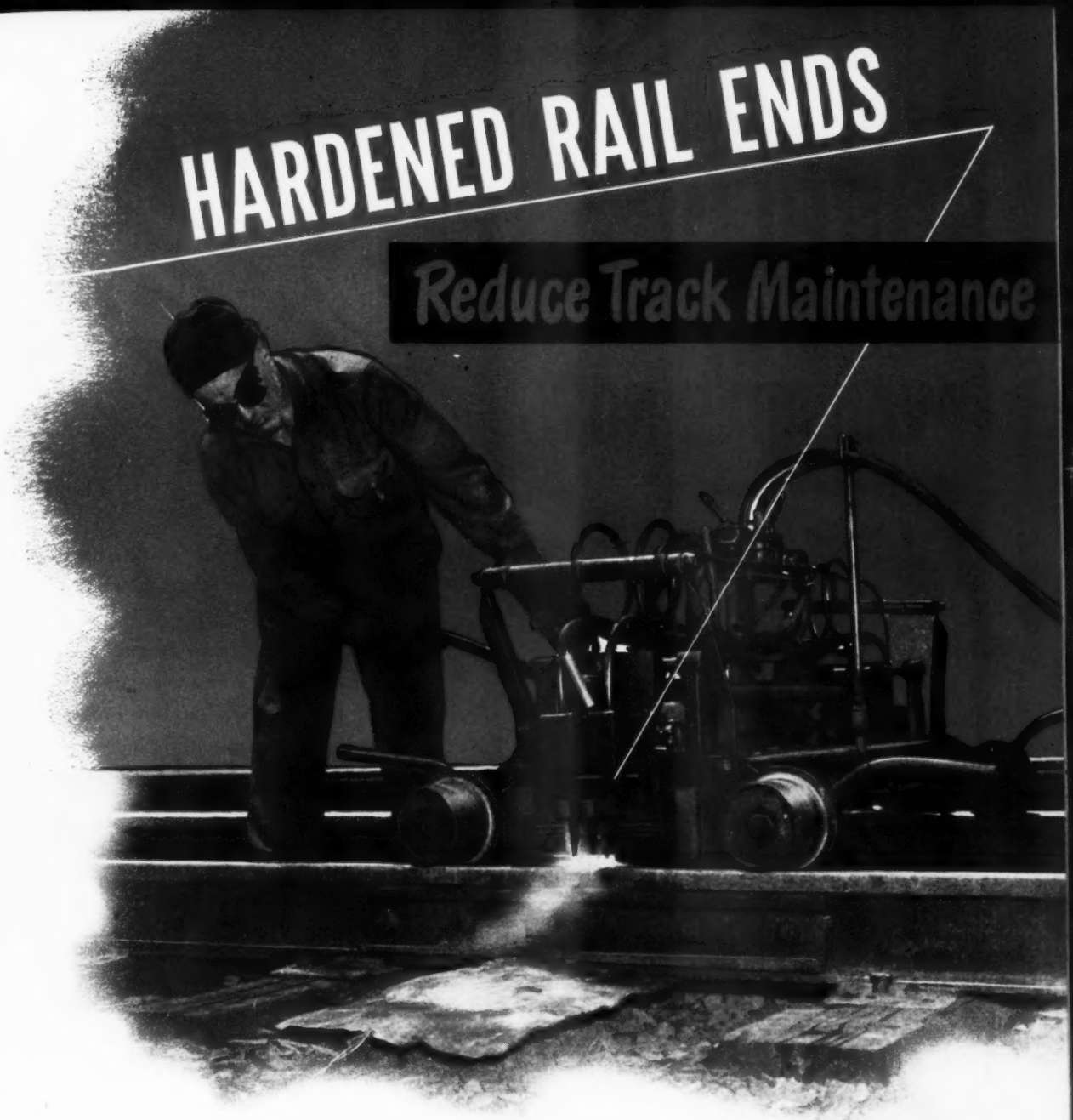
NORDBERG MACHINERY

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

Export Representative—WONHAM Inc.—44 Whitehall St., New York

HARDENED RAIL ENDS

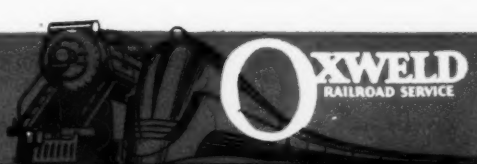
Reduce Track Maintenance



● Flame-hardened rail ends resist batter, greatly prolonging the service life of rail in first position. The possibility of secondary batter is eliminated since rail ends hardened by Oxweld's method wear at about the same rate as the rest of the rail.

Maintenance time and costs are reduced because smooth rail ends cause less wear on joint bars and bolts as well as on rolling stock. The work may be done in track without interrupting traffic, but for greatest economy rail-end hardening is done as a part of the rail-laying program.

Ask an Oxweld representative for more information about end hardening and other oxy-acetylene maintenance procedures.



OXWELD RAILROAD SERVICE

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York

Government-Owned

SURPLUS STEEL

Reasonably priced for substitute uses

AVAILABLE NOW

Terms to fit your production budget

Over 50,000 tons of hot rolled and cold finished carbon and alloy steel bars in rounds, squares, flats and hexagons, priced downward—for substitute uses.

Budget priced, these 50,000 tons consist of 25,000 tons of carbon and 25,000 tons of alloy H.R. & C.F. bars, in sizes to meet your immediate requirements.

In addition, there are 60,000 tons of carbon and alloy billets, blooms and slabs. These semi-finished products are also priced for quick delivery in meeting the demands for substitute uses. If you qualify for credit, terms may be arranged. For detailed specifications, grades, sizes, deliveries and F.O.B. prices, simply write, wire or phone the nearest RFC Agency listed below.

WHAT ARE YOUR REQUIREMENTS? — CHECK THIS LIST

1. Carbon and Alloy Billets, Blooms, Slabs, Skelp, Rods, etc. . . . . ☐
2. Reinforcing Bars . . . . . ☐
3. Structural Steel Shapes . . . . ☐
4. H. R. & C. R. Sheets, Strip Steel, Carbon and Alloy . . . . . ☐
5. Plates—Tin Plate, Terne Plate, Black Plate . . . . . ☐
6. Wire and Wire Products, Carbon and Alloy, Wire Rope, Reinforcing Wire Mesh . . . . . ☐
7. Stainless Steel Sheets, Strips, Standard Types . . . . . ☐
8. Iron and Steel Pipe, and Tubing—Valves and Fittings . . . . . ☐
9. Mechanical Tubing, Carbon and Alloy . . . . . ☐

Name .....

.....

Firm .....

.....

Address.....

.....

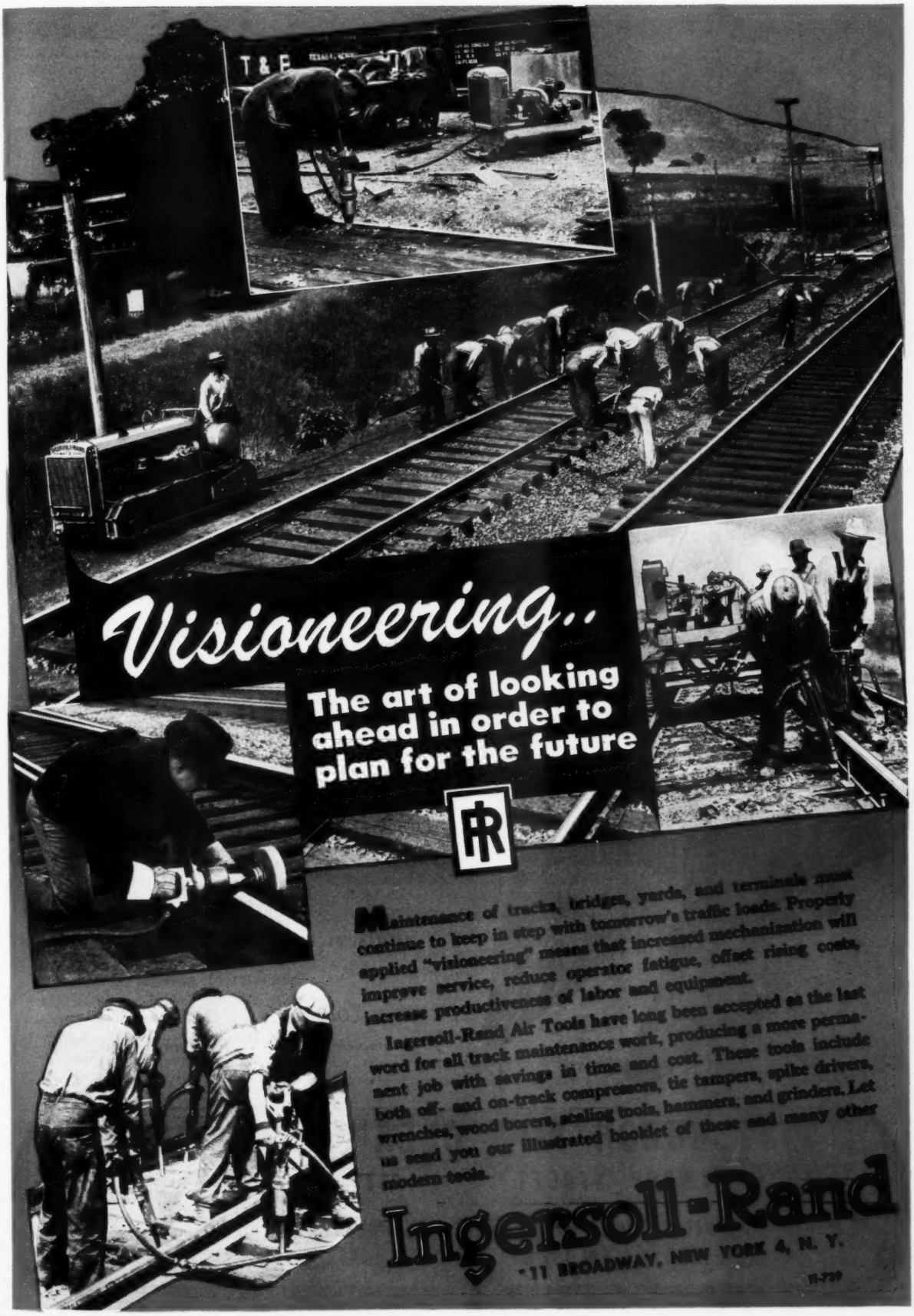
VETERANS: **To help you in purchasing surplus property from the RFC, a veterans' unit has been established in each of our Disposing Agencies.**

RECONSTRUCTION FINANCE CORPORATION

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION

Agencies located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver Detroit • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

157-2


Visioneering..
The art of looking ahead in order to plan for the future
Maintenance of tracks, bridges, yards, and terminals must continue to keep in step with tomorrow's traffic loads. Properly applied "visioneering" means that increased mechanization will improve service, reduce operator fatigue, offset rising costs, increase productiveness of labor and equipment.
Ingersoll-Rand Air Tools have long been accepted as the last word for all track maintenance work, producing a more permanent job with savings in time and cost. These tools include both off- and on-track compressors, tie tampers, spike drivers, wrenches, wood borers, scaling tools, hammers, and grinders. Let us send you our illustrated booklet of these and many other modern tools.
Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.
11-739

A RECIPE FOR

CLEAN PIPES

Proper combination of the right ingredients produces the best results in baking as well as the best results in pipe cleaning.

In pipe cleaning, the right ingredients are—

- Specialized Tools
- Experienced Engineers
- Plenty of "Know-How"
- Numerous successfully completed jobs.

Pittsburgh Pipe Cleaner Company experts have the knack of providing the proper combination of these necessary ingredients. That is why their recipe for clean pipes means the best pipe cleaning job for you.

MECHANICAL AND HYDRAULIC PIPE CLEANING

Write TODAY for information about our complete contract pipe cleaning service.

PITTSBURGH PIPE CLEANER COMPANY

433 MELWOOD STREET PITTSBURGH 13, PENNA

PITTSBURGH, PHILADELPHIA, BALTIMORE, WASHINGTON.
NEW YORK, BUFFALO, CHICAGO, CINCINNATI, ST. LOUIS, DETROIT

Red Lead is
ALWAYS Pb_3O_4... *that's why*
it's a Dependable Metal Paint

Industry has yet to discover a better metal protective paint than Red Lead. This is due to inherent fundamental properties of the pigment itself.

Among the most important of these are Red Lead's definite chemical composition and its purity, as distinguished from pigments that have indefinite composition or vary from batch to batch, with resulting possibility of variation in performance.

The reason for this uniformity is that red lead is a simple chemical compound—a combination of only two elements, oxygen and high-purity metallic lead. It is also an extremely pure compound, containing no corrosion accelerating impurities such as water-soluble chlorides or sulfates.

Uniform performance means predictable chemical behavior—dependable performance as a rust-inhibitive paint, day after day, job after job.

Furthermore Red Lead has the property of controlling acid conditions recognized as accelerators of rust. In the presence of various acids, Red Lead forms insoluble lead salts, at the approximate rate at which the acids are supplied. This is true whether the acids originate from acid forming environments, such as gas, smoke, and moisture in the atmosphere, or from the oxidation of the paint vehicle.

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including all the fast drying resins.

Specify RED LEAD
for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better paint for surface protection of metal if it contains Red Lead.

***These spectograms** show the high degree of uniformity and purity of nine different batches of Red Lead. Each spectrum is a practical duplicate of every other. Such uniformity is an important reason for Red Lead's outstanding performance.*

* * *

Write for New Booklet — *"Red Lead in Corrosion Resistant Paints"* is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas. If you haven't received your copy, address nearest branch listed below.

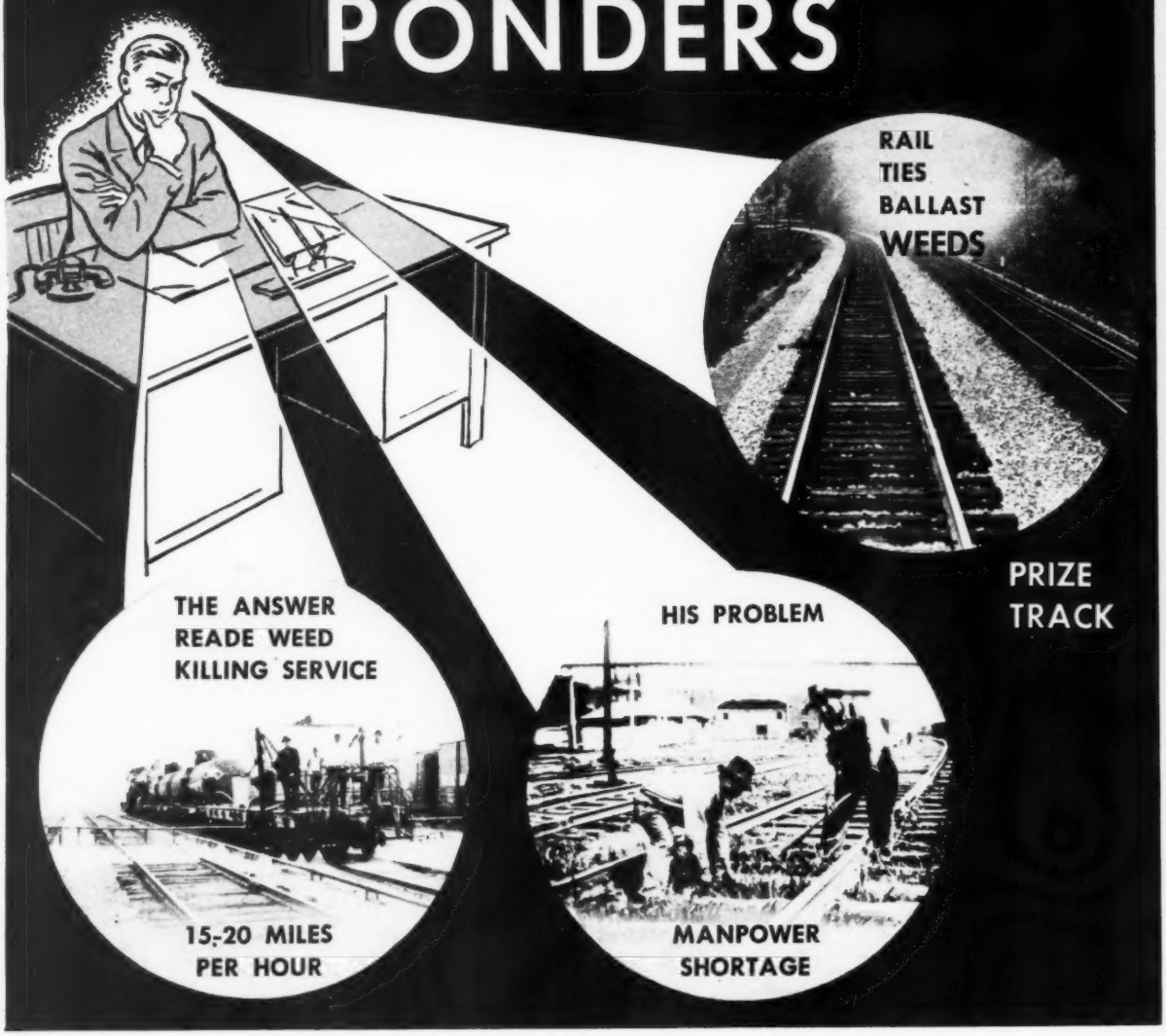
* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National Lead Co. of Mass.); Philadelphia 7 (John T. Lewis & Bros. Co.); Pittsburgh 30 (National Lead Co. of Pa.); Charleston 25, W. Va. (Evans Lead Division).

Dutch Boy
Red Lead

THE MAINTENANCE ENGINEER PONDERS



QUITE A PROBLEM

THIS MATTER OF EFFECTIVE WEED CONTROL, WITH MANPOWER SHORTAGE

It's no problem when THE READE COMPANY is engaged to treat roadbed with "HERBICIDE" or "HERBICIDOL." We provide equipment that is capable of spreading chemical on one, two or three tracks over a distance of fifty or more miles per day. THAT IS REAL ACCOMPLISHMENT IN TRACK WEEDING.

THE APPLICATION OF WEED KILLER USING WATER AS A VEHICLE IS A NATURAL, because plant life seeks its life sustaining water supply, moving its roots great distances to tap a source of water or deep into the ground where the water does not approach the surface. Once in contact with chemical weed killing solution, the destructive potion is absorbed by tops and roots and decomposition of plant cells gets under way.

Apply weed killer in the morning and by afternoon the work of destruction is already in progress. Decomposition sets in rapidly.

CONTROL OF WEEDS IS A HIGHLY SPECIALIZED BUSINESS where wide experience is necessary for success. Sizable plant capacity at strategic railroad centers permits us to meet peak short seasonal demand.

Few executives appreciate the heavy toll taken by prolific weed growth, nor the many economies in longer life of timber and track equipment that is realized when the growth is discouraged.

CONSULT US FOR A PROGRAM OF WEED CONTROL THIS YEAR.

READE MANUFACTURING COMPANY

135 Hoboken Ave.,
Jersey City, N. J.

9500 Cottage Grove Ave.,
Chicago, Ill.

An optical comparator used to check gear thread profiles in the OLIVER "Cletrac" plant.

Check . . . and double check

It's fundamental at Oliver "Cletrac" . . . the checking and double checking of all tractor parts before they are assembled. The most modern of testing and checking devices are in daily use as typified by this operator checking the thread profile of a gear.

The thread, magnified 62½ times, is projected on the screen where minor and major diameters, including angle and lead, can be checked within .0001. Use of precision equipment such as this guarantees that nothing is left to chance in building Oliver "Cletracs."

Quality is the standard that characterizes every tractor part . . . in design, workmanship, materials and performance.

Maintenance of that standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

CLETRAC

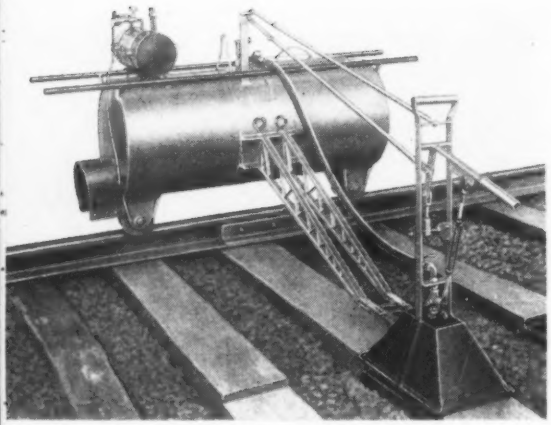
THE OLIVER CORPORATION Cletrac

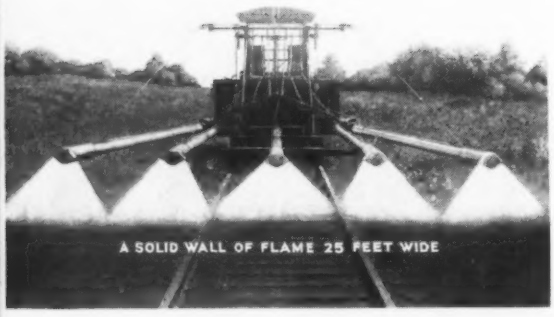
a product of

The OLIVER Corporation

Modern Service
requires modern track maintenance

THE SOUTHERN SR SERVES THE SOUTH




A SOLID WALL OF FLAME 25 FEET WIDE

A basic necessity for delivering excellent service, day in and day out, with high speed trains like the *Southerner*, *Tennessean*, and other crack streamliners on the Southern's schedule is a well-maintained track. For modern track maintenance the Southern and more than 75 other Railroads use WOOLERY WEED BURNERS to keep their tracks weed free.

Relaying steel gangs can now apply creosote to newly adzed ties cheaper, faster and far more safely and in a much better way with the WOOLERY CREOSOTE SPRAYER. Only two men are necessary to operate the machine. Tank capacity 60 gallons. Equipped with generator burner to heat creosote and wind protection hood to safeguard men from contact with creosote.

WOOLERY WEED BURNERS

5-burner, 3-burner, 2-burner and 1-burner models

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS · MOTOR CARS · TIE CUTTERS · TIE SCORING MACHINES · RAIL JOINT OILERS · CREOSOTE SPRAYERS · BOLT TIGHTENERS

EXCLUSIVE EXPORT REPRESENTATIVES PRESSED STEEL CAR COMPANY INC PITTSBURGH PENNA

The New W4.5 Athey MobiLoader

Athey APCOR Products

More than 500 Athey MobiLoaders on tough loading jobs today are proving Athey MobiLoader performance and dependability. Now comes the greatly improved Model W4-5—a product resulting from intensive engineering research and two years of grueling field tests.

With many outstanding improvements in design the new Athey W4-5 MobiLoader, which is powered by the "Caterpillar" Diesel D4 Tractor, offers better visibility, hydraulic "finger-tip" control, greater stability, increased production, and other refinements.

To contractors, highway officials, miners, quarry operators, street departments, seeking low-cost, dependable loading, the Athey W4-5 MobiLoader is the money-saving answer. Its "straight-line" operation cuts loading time; boosts production and saves wear on the tractor. Get more facts on the new Athey W4-5 MobiLoader from your Athey-"Caterpillar" Dealer, or write direct to

ATHEY PRODUCTS CORPORATION
CHICAGO 38, ILLINOIS

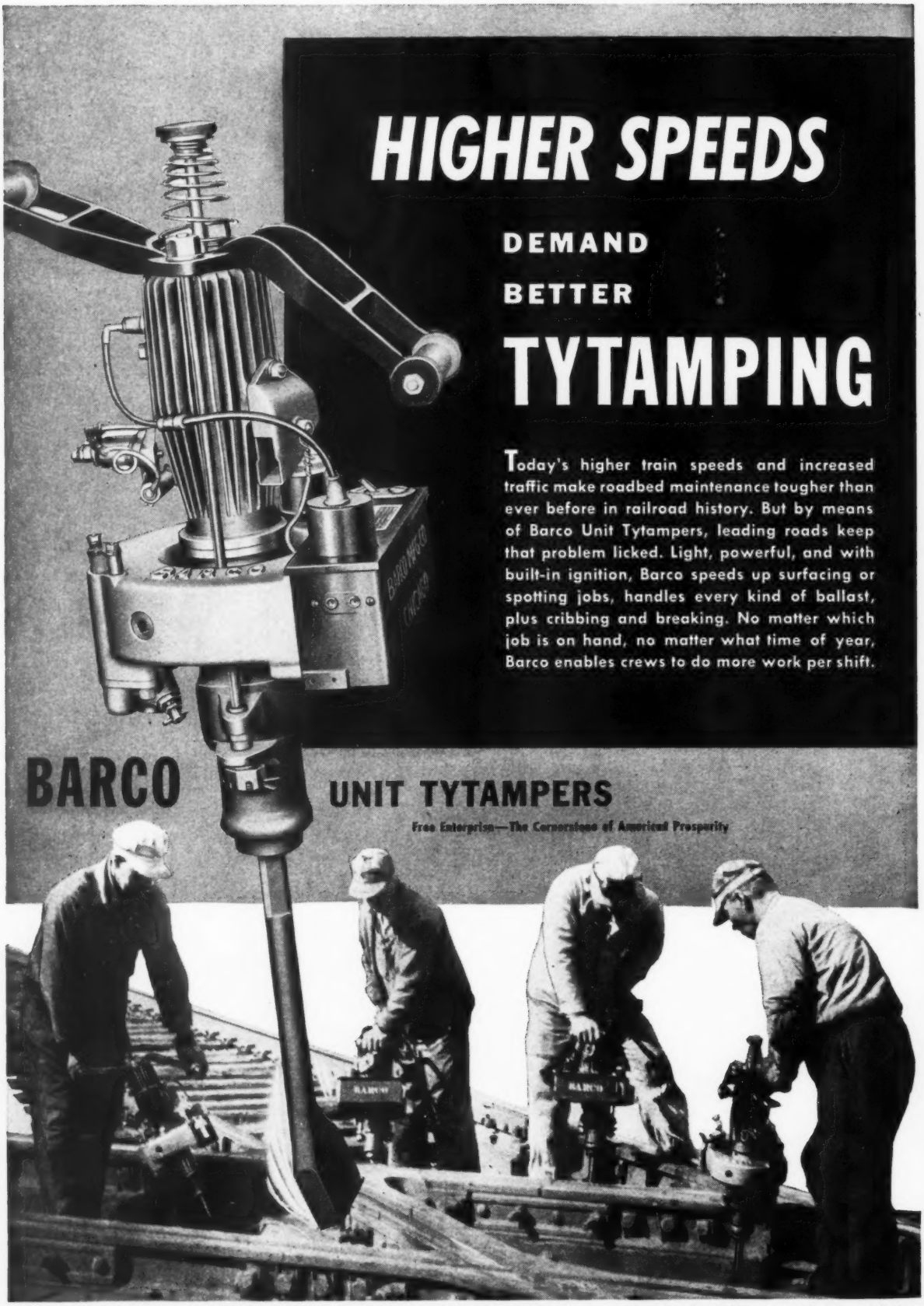
HIGHLIGHTS
OF THE NEW W4-5

☆ ☆ ☆ ☆ ☆ ☆

MORE STABILITY ☆ HYDRAULIC "FINGER-TIP" CONTROL ☆ BETTER VISIBILITY ☆ GREATER PRODUCTION ☆ SIMPLIFIED DESIGN ☆ OPERATES WITH "CATERPILLAR" DIESEL D4 TRACTOR.

☆ ☆ ☆ ☆ ☆ ☆

Athey


HIGHER SPEEDS
DEMAND
BETTER
TYTAMPING
Today's higher train speeds and increased traffic make roadbed maintenance tougher than ever before in railroad history. But by means of Barco Unit Tytampers, leading roads keep that problem licked. Light, powerful, and with built-in ignition, Barco speeds up surfacing or spotting jobs, handles every kind of ballast, plus cribbing and breaking. No matter which job is on hand, no matter what time of year, Barco enables crews to do more work per shift.
BARCO
UNIT TYTAMPERS
Free Enterprise—The Cornerstone of American Prosperity

BARCO MANUFACTURING COMPANY, NOT INC., 1805 Winnemac Ave., Chicago 40, Ill. • In Canada: The Holden Co., Ltd., Montreal, Can.

Announcing the

New BUDA POWER Track D

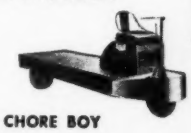
. . . ALL THE FEATURES RAILROAD MEN WANT

Easy to Use . . .

- **FAST**—*Drills holes in 30 seconds!*
- **COMPACT and LIGHT**—*Weighs only 130 lbs.*
- **ONE MAN OPERATION**—*Easily set up.*
- **SAFE and ACCURATE**—*Fast, precision adjustment.*
- **PROVED IN SERVICE**—*One railroad saved over $600.00 in one month's operation.*

• *WRITE FOR NEW BULLETIN 1233* •

Drills Between Narrow Rail Sections near Switches



BUDA CHORE BOY

BUDA

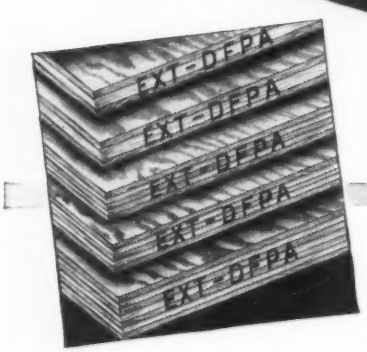
15403 Commercial Ave.
HARVEY (Chicago Suburb) **ILLINOIS**

BUDA JACKS

Exterior-Type DOUGLAS FIR PLYWOOD

(Made With Completely Waterproof Binder)

● Between boiling treatments, lasting four hours, tiny samples of Exterior-type Douglas Fir Plywood are subjected to 145-degree "bake-oven" testing. The samples, collected at random, also undergo other rigid tests in the Douglas Fir Plywood Association laboratory. The waterproof binder MUST stand the gaff!



. . . tested in the laboratory ...proven in scores of railroad uses!

ALWAYS LOOK FOR THE EXT-DFPA GRADE "TRADE-MARK"

It appears on the edge of every genuine Exterior panel—your assurance that you are getting a plywood made especially for permanent outdoor use. Exterior-type and ONLY Exterior-type should be specified for use demanding exposure to water and weather.

Exterior-type Douglas fir plywood is made with completely waterproof synthetic resin binder especially for permanent outdoor use—for use **wherever** moisture conditions are abnormal.

Thoroughly laboratory tested, Exterior-type plywood has proven its qualities in actual railroad use as well. Exterior-type plywood is now serving successfully in box cars, reefers, troop sleepers, cabooses, work trains—in shims, dust covers, station and maintenance buildings. For a material that combines strength, rigidity and light weight, specify Exterior-type Douglas fir plywood.

HERE ARE THE SIZES: Exterior-type Douglas Fir Plywood is made in these standard widths, lengths and thicknesses:

ITEM	WIDTH (Inches)	LENGTH (Inches)	THICKNESS (Inches) (After Sanding)
Standard Panels (G2S-Ext.) (G1S-Ext.) (S2S-Ext.) (S1S-Ext.)	12	48	3/16 (3 ply)
	14	60	1/4 "
	16	72	5/16 "
	18	84	3/8 "
	20	96	7/16 (5 ply)
	22		1/2 "
	24		9/16 "
	26		5/8 "
	28		11/16 "
	30		3/4 "
	36		13/16 "
	42		7/8 (7 ply)
	48		15/16 "
			1 "
			1 1/16 "
			1 1/8 "
			1 3/16 "

Sizes of Sheathing Exterior, Industrial Exterior and Concrete-form Exterior sent on request

*Number of plies listed under thickness is minimum.

Douglas Fir Plywood Association engineers will be happy to work with you in solving any construction problem through the use of Exterior-type Douglas fir plywood. Write or wire for technical data.

DOUGLAS FIR PLYWOOD
LARGE. LIGHT. STRONG.
Real Wood
PANELS

DOUGLAS FIR PLYWOOD ASSOCIATION

Tacoma 2, Washington

WORTH REMEMBERING

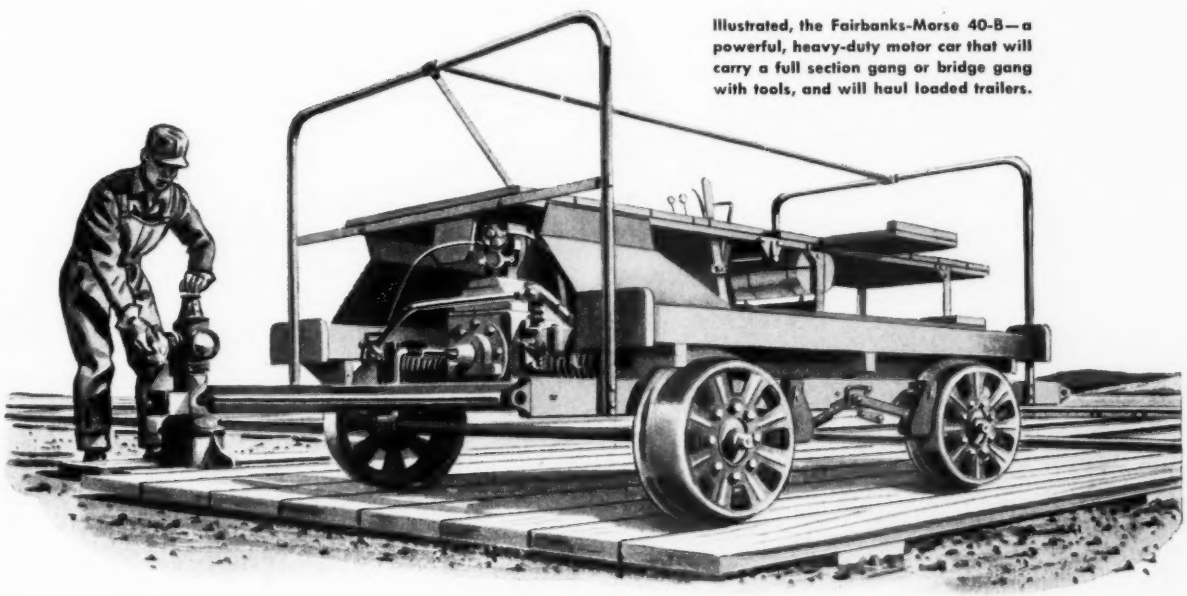
see Fairbanks-Morse FIRST FOR MOTOR CARS

FIRST . . . because to merit motor car business from American railroads for more than 50 consecutive years, Fairbanks-Morse Motor Cars are *proved* dependable—safe—efficient.

The sturdy two-cycle reversible engine employed in most models has the extra power needed for grades and curves. Combined with the simple construction of the engine is lightness, especially essential to motor cars in this day of high-speed passenger and freight schedules.

Fairbanks-Morse makes a car for signal maintainers, for track inspectors, for superintendents, section or bridge gangs—many types all built under one guarantee by one manufacturer. For your motor car needs, specify "Fairbanks-Morse."

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

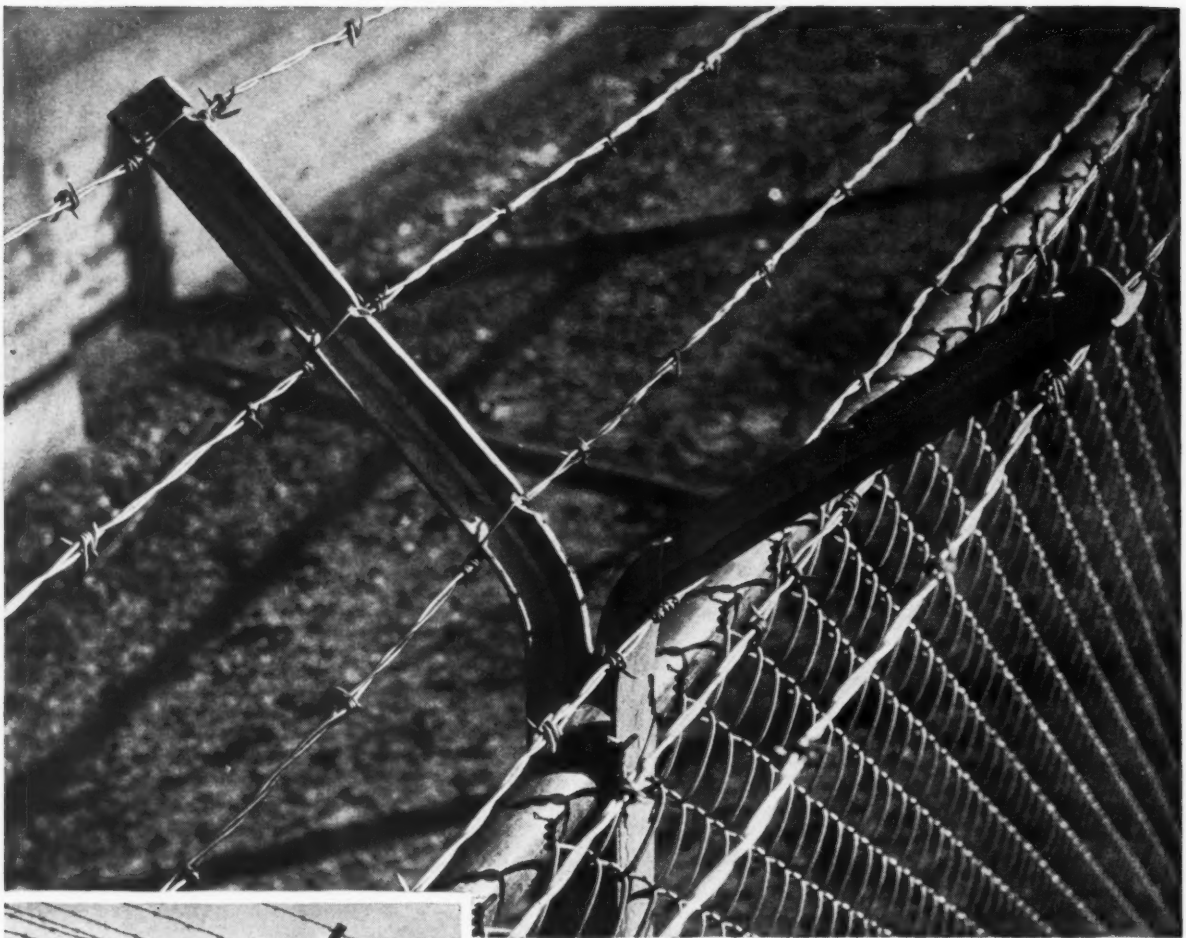


Illustrated, the Fairbanks-Morse 40-B—a powerful, heavy-duty motor car that will carry a full section gang or bridge gang with tools, and will haul loaded trailers.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines
Scales • Motors • Pumps • Generators
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment



PIONEERING A NEW AND NOVEL CHAIN LINK FENCE ASSEMBLY—

Complete sturdy design of split * H-post eliminating removable parts, saves erection time, simplifies entire fence construction.

* PATENT APPLIED FOR

ANOTHER CF&I SERVICE TO RAILROADS

The Colorado Fuel and Iron Corporation

General Offices: Denver, Colorado — Steel Works: Pueblo, Colorado

BANISH

RAIL JOINT CORROSION

WITH **RMC** RAIL JOINT PACKING

Acting as a preservative and a lubricant, RMC Rail Joint PACKING will last for the life of the rail. RMC PACKING is easy to apply—furnished in pre-formed blocks to fit the joint bar.

IMPORTANT

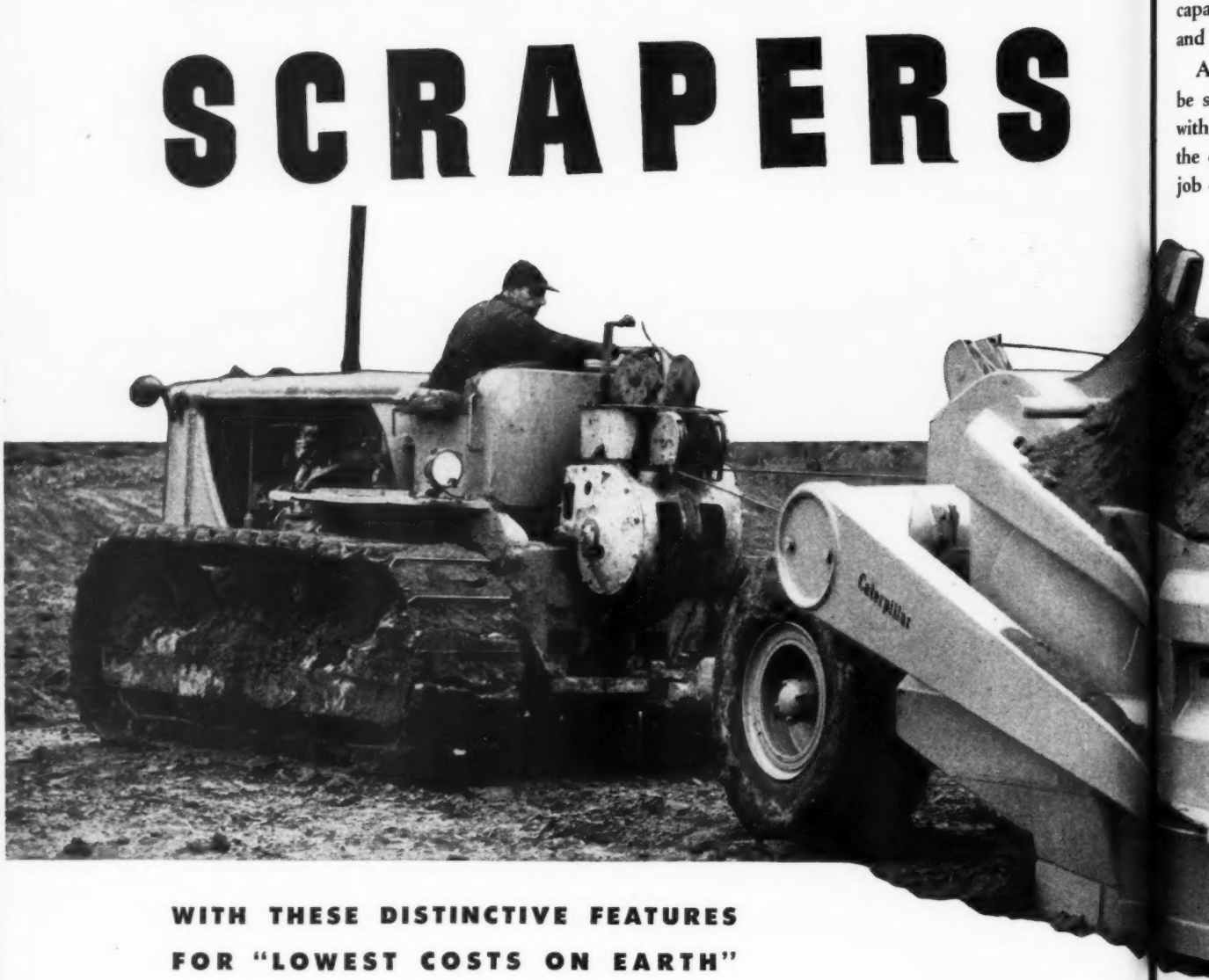
Order your RMC PACKING now so that it will be on hand when needed.

RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

Introducing

"CATERPILLAR" SCRAPERS



WITH THESE DISTINCTIVE FEATURES FOR "LOWEST COSTS ON EARTH"

1 **"COMPLETE PACKAGE" EARTHMOVER**

Tractor and scraper built to work together • One high standard of material and workmanship • One service source—the best in the business.

2 **OPEN-BOWL DESIGN FOR:**

Greater stability • Good visibility • Loading with shovel or dragline.

3 **OPTIONAL TIRE SIZES FOR:**

Correct flotation • Tires matched to the job • Minimum rolling resistance • Bigger pay-loads • Longer tire life.

4 **DOUBLE-CURVED, SELF-SHARPENING CUTTING EDGES FOR:**

"Live loading" with longer boiling action • Digging hard material • Shorter loading distance • Less loading time.

5 **HIGH APRON LIFT TO CLEAR THE STICKIEST MATERIALS**

6 **POSITIVE, CLEAN EJECTION**

7 **LONG CABLE LIFE FROM:**

Correct reeving • Over-sized, precision-grooved sheaves.

ANOTHER IN THE GREAT NEW LINE OF "CATERPILLAR" EARTHMOVING EQUIPMENT

First the bulldozers (recently announced), and now the *open-bowl* scrapers have gone into production. "Caterpillar" research projected them. "Caterpillar" engineering designed them. "Caterpillar" proving has okehed them after every conceivable test of performance — for mechanical efficiency, for work capacity, for long-lived stamina, for operating ease and economy.

As in every product "Caterpillar" offers, you may be sure that these scrapers are tops in the field — with features, materials and workmanship that give the earthmover undisputed profit advantages — per job or per life of product.

To individual mechanical superiority, "Caterpillar" Scrapers give you the further advantage of *one service source* when teamed up with "Caterpillar" Diesel Tractors . . . both made by the same manufacturer and kept in working condition by a single dealer organization unequaled for completeness.

See your "Caterpillar" dealer about these new "Caterpillar" Scrapers; about the new "Caterpillar" Bulldozers — and how, with "Caterpillar" Diesel Tractors, the advantages of ideally matched earthmoving equipment can be realized for the first time in construction history.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

THREE SIZES

STRUCK MEASURE

No. 80	13.8 YARDS
No. 70	8.7 YARDS
No. 60	6.0 YARDS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The discharged veteran wears this emblem. Remember his service and honor him.

These piles drive straight and fast

You save time and money when you specify ARMCO Welded Steel Piling for foundation work. Long lengths drive fast, stay straight!

Many railroad engineers and maintenance men know why ARMCO Welded Steel Piling is the simple, practical answer to foundation piling problems. They find it ideal for bridges, terminals, and other heavy construction jobs.

These foundation piles *drive straight* with the least time and effort. The tough spiral weld imparts extra lateral stiffness and high collapse resistance to even the longest lengths. Yet ARMCO Foundation Piles are relatively light in weight for quick, easy handling. Long lengths save driving time, cut construction costs.

For greatest economy specify the exact wall thickness you need. Diameters range from 6 to 36 inches, wall thicknesses from 3/16 to 1/2-inch. When you need cone points, end plates or cutting shoes, these can be mill attached. Write for prices. Armco Drainage & Metal Products, Inc., 835 Curtis Street, Middletown, Ohio.

FOR WATER PIPE

ARMCO Welded Steel Pipe is economical for water lines of all kinds. It is supplied with special coatings for water service in 6" to 36" diameters. Also special fittings.

ARMCO

Armco Welded Steel Pipe

Williams "Superrenches"

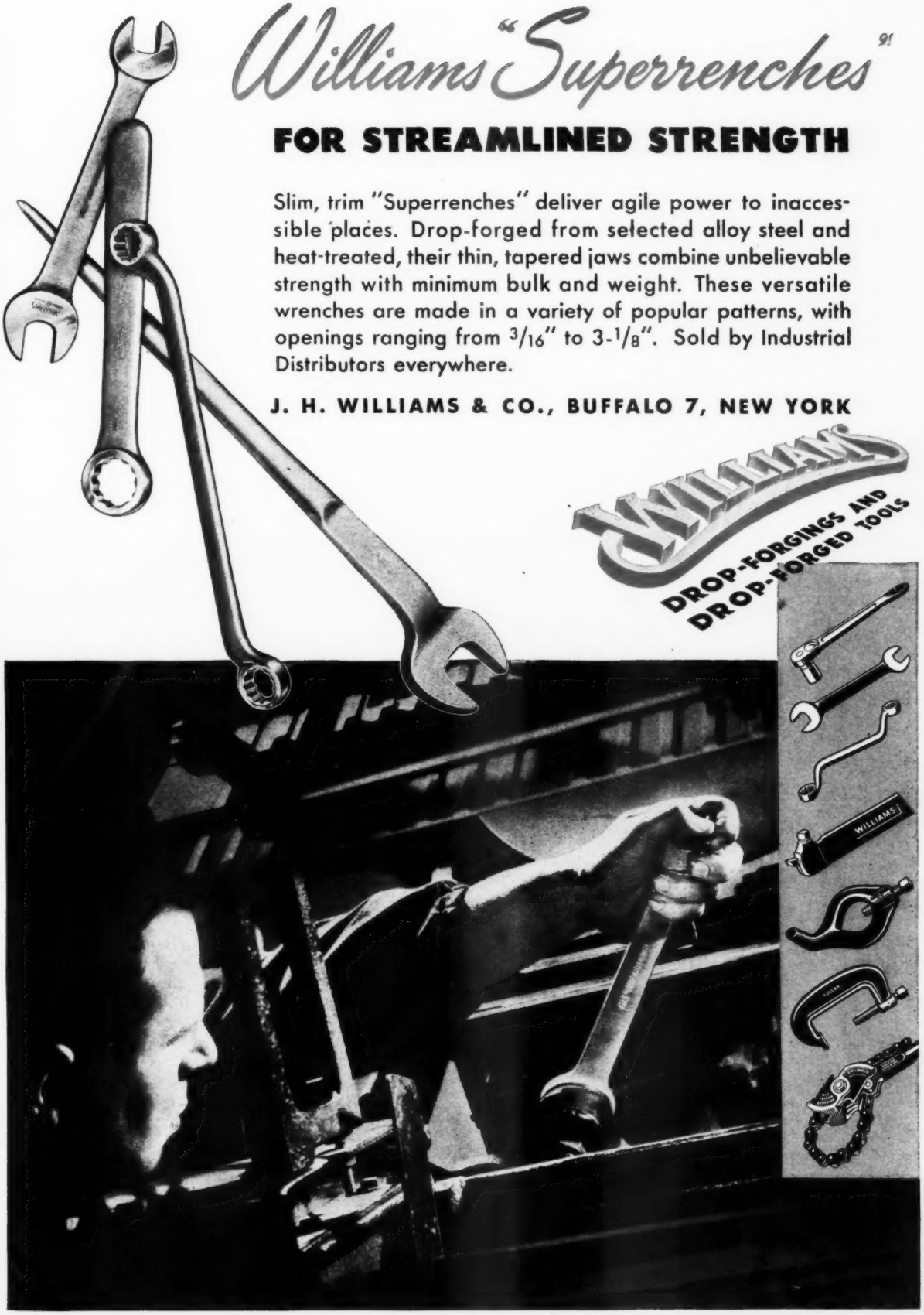
FOR STREAMLINED STRENGTH

Slim, trim "Superrenches" deliver agile power to inaccessible places. Drop-forged from selected alloy steel and heat-treated, their thin, tapered jaws combine unbelievable strength with minimum bulk and weight. These versatile wrenches are made in a variety of popular patterns, with openings ranging from 3/16" to 3-1/8". Sold by Industrial Distributors everywhere.

J. H. WILLIAMS & CO., BUFFALO 7, NEW YORK

WILLIAMS

DROP-FORGINGS AND DROP-FORGED TOOLS



No. 206 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: Maybe an Idea for You

Dear Readers: February 1, 1946

We have been told on so many occasions of effective ways certain of you are using Railway Engineering and Maintenance among your men in the interest of keeping them informed, and, in effect, "on their toes" as regards current developments and practices, that I am prompted to mention some of them here, with the thought that they may give some of you an idea that you can use to advantage.

For example, several chief maintenance officers have told us that they seldom read a copy of Maintenance without initialing certain articles for the special attention of men on their staffs, often asking for comments or suggestions, even though they know that these men receive their own copies regularly. These and other maintenance officers sometimes ask for reprints of certain articles, and, more frequently, reproduce articles in whole or in part in their own offices for distribution among their men.

And such measures are not confined to these higher maintenance officers, because we hear repeatedly of similar action being taken by division officers, some of whom, in addition, make it a regular practice to discuss questions raised in various issues at their periodic staff of safety meetings. Several roads which hold foremen's meetings carry this same practice into these meetings, often discussing the questions raised monthly in our What's the Answer columns, one by one, under the direction of the local supervisors. And at least one supervisor doesn't wait for such meetings; he takes particularly pertinent questions directly to his foremen. For example, he wrote to "All Foremen" recently, in part:

"This is written to ask your opinion regarding question No. 3 on page 1031 of the current issue of Railway Engineering and Maintenance, which reads as follows: What injuries to the base of a rail require its replacement? Why?

"Quite a bit is said about this subject on page 1019, which, no doubt, you have read and studied before receiving this note. This article mentions some 25 causes of rail damage. Personally, I think one of the main causes is not mentioned. What do you think? Please do not hesitate to give me your full and free opinion."

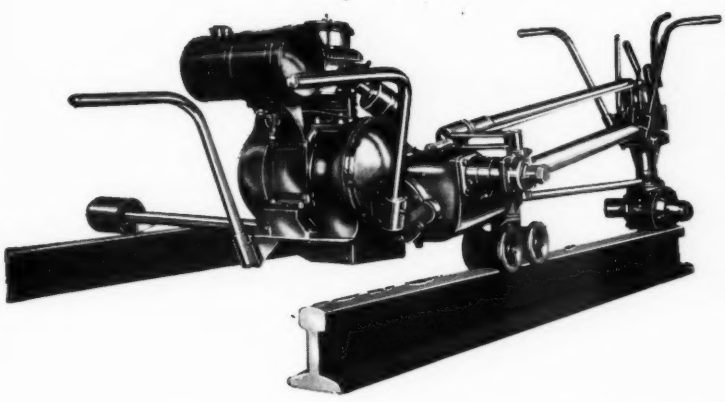
Is there an idea for you in any of these practices? Why not make your copies of Railway Engineering and Maintenance do the best possible job for you and your men?

Sincerely,

Neal D. Howard
Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

Announcing the new
Model B Raco Power Track Wrench



Greater Power

Greater Speed

Vastly Greater Flexibility

Remarkable ease of operation

Model B Raco Power Track Wrench combines the automatic torque control for **accurate** out of face tightening, with **excess power** for rapid removal of rusted nuts in rail laying.

The **high speed** runs new nuts on new bolts to the desirable initial tension.

Chucks operate in unison from one set of controls, **each** with high and low speeds, **both** forward and reverse. Chuck head does **not** turn.

The 7.20 H.P. Briggs & Stratton type ZZ motor is run at **economical** engine speed.

Operating head has **floating balance.**

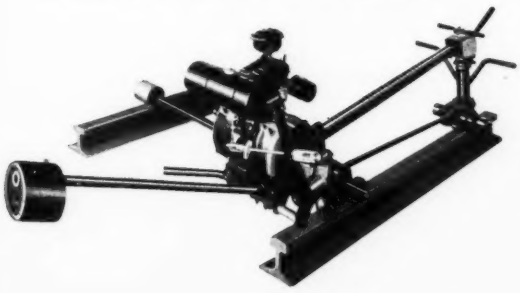
Control lever operating in "Z" slot, allows **instant shift** through neutral to either high or low speed.

Full power lever at operator's left hand. Reverse lever on side of operating head.

Micro Cutout located in cylinder on side of gear housing, with scale at slot under spring clamp. It can be **sealed** with car seal, if desired.

Full power lever operates through Micro Cutout without reference to setting of latter.

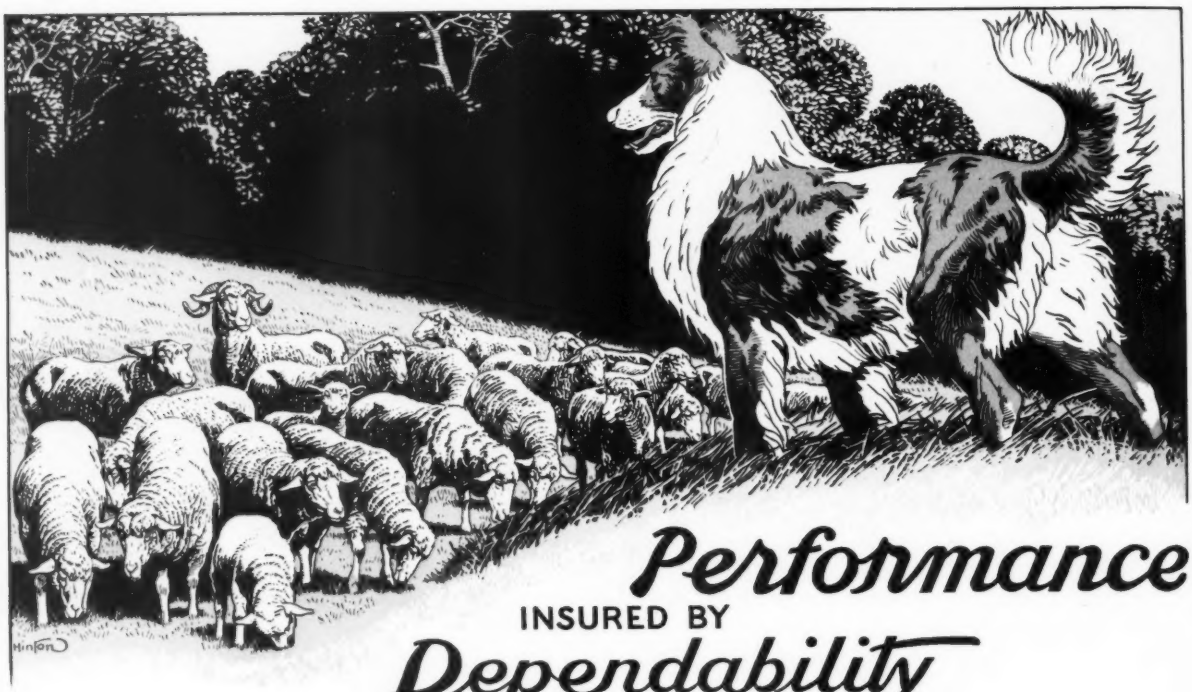
There are **four power combinations,** two on each chuck.



We shall continue to produce the Model A Raco Power Track Wrench for use where excessive power is not required.

RAILROAD ACCESSORIES CORPORATION

CHRYSLER BUILDING • NEW YORK

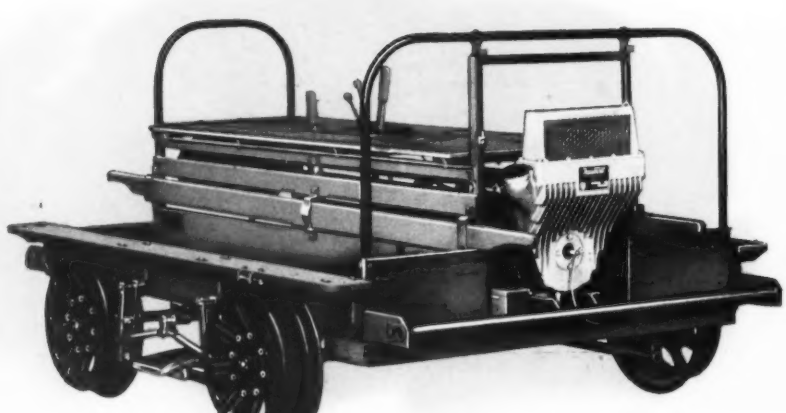


Performance INSURED BY Dependability

The sheep dog's work is inspiring. Smooth coordination of effort does the task efficiently and without lost motion. The sheep dog is renowned for its dependability. Dependable motor cars are a mighty important factor in the efficient handling of railroad maintenance work. And railroad maintenance men place high value on the dependable Fairmont equipment. Fairmont motor cars have earned their reputation for dependability through years of performance on the job—an important reason why most railroad men use and prefer the Fairmont.

Fairmont

Fairmont Railway Motors, Inc., Fairmont, Minnesota.



Fairmont's M14 Series G (illustrated at the left) is a light section car for 1 to 6 men with 1200 pound load capacity. This car is a good example of modern design, strength and light weight. Lifting weight is only 112 pounds. The car may be equipped with our two-speed gear which increases drawbar pull 50 per cent. Bulletin 397.

Performance ON THE JOB COUNTS

OF ALL THE CARS IN SERVICE TODAY . . . MORE THAN HALF ARE FAIRMONTS

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 West Adams St., Chicago 3

New York 7,
30 Church Street

Cleveland 13,
Terminal Tower

Washington, D.C., 4,
1081 National Press Bldg.

Seattle 1,
1033 Henry Bldg.

San Francisco 4,
300 Montgomery St.

Los Angeles 14,
530 West 6th St.

Dallas 4,
4518 Roland Ave.

Samuel O. Dunn, *Chairman of the Board*; Henry Lee, *President*; Roy V. Wright, *Vice-President* and *Secretary*; Frederick H. Thompson, *Vice-President*; F. C. Koch, *Vice-President*; H. A. Morrison, *Vice-President*; Robert E. Thayer, *Vice-President*; J. G. Lyne, *Vice-President*; H. E. McCandless, *Vice-President*; John T. DeMott, *Treasurer*.

Subscription price in the United States and Possessions and Canada, 1 year $2, 2 years $3; foreign countries, 1 year $3, 2 years $5. Single copies, 35 cents each. Address H. E. McCandless, Circulation Manager, 30 Church Street, New York 7, N.Y.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.)

PRINTED IN U.S.A.

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

FEBRUARY, 1946

Editorials - 153
Competition—Fusees—Outlook—Research—Cleaning Ballast

Overcomes Adverse Conditions on Cairo Bridge - - - - - - - 156
Part II of article describes how continuous rails were installed on Illinois Central structure to eliminate joint impact

Research—Maintenance Men Must Help - - - - - - - - - - 160
J. B. Akers reviews the advances produced by scientific investigation and outlines the problems that remain to be solved

N. & W. Makes Annual Track Awards - - - - - - - - - - - 163
Announces results of 1945 inspection which included the making of cash awards to 82 section foremen for outstanding work

Train Overtakes Motor Car—Three Die - - - - - - - - - - 164
An abstract of a report of the Interstate Commerce Commission giving the details of an accident on the Delaware & Hudson

Cleaning Six Miles of Sewers - - - - - - - - - - - - - - 165
Describes the procedure used to remove objectionable material from the sewerage system serving Clearing yard at Chicago

The Future Challenges the Track Man - - - - - - - - - - 167
A. G. Reese outlines some of the problems facing maintenance forces and gives his views as to what can be done about them

Maintaining Water Service Facilities - - - - - - - - - - 169
No. 16 of the series is the first section of a two-part article dealing with the maintenance of various types of tanks

What's the Answer? - - - - - - - - - - - - - - - - - - 174
How Long a Guard Rail?
Tipping Rails on Curves
Trends in Pumping Practice
Floors for Section Houses
Fireproofed Wood for Buildings
Concrete in Cofferdams
Punching Tie Plates
What Sizes for Gravel Ballast

Products of Manufacturers - - - - - - - - - - - - - - - 181

News of the Month - - - - - - - - - - - - - - - - - - 183

NEAL D. HOWARD
Editor

MERWIN H. DICK
Managing Editor

JOHN S. VREELAND
Eastern Editor

GEORGE E. BOYD
Associate Editor

CHARLES C. ROBINSON
Associate Editor

S. WAYNE HICKEY
Business Manager

YOU CAN HAVE AN INDEX

Copies of the index for 1945 will be issued to subscribers asking for them. If you desire a copy of the index please send in the coupon below.

Circulation Manager
Railway Engineering and Maintenance
30 Church St., New York 7, N. Y.

Please send index to address below

Name .....

Complete Protection

for hand thrown switches with Racor switch point locks

Now, main line facing point switches can positively be held in a closed position — regardless of failure or damage of any part of the switch throwing mechanism.

Racor Switch Point Lock operates independently of the switch stand and is protected from damage because all essential working parts are installed below the top of the ties. Adjustable lock rod permits easy and accurate installation of these locks to any design of switch or switch stand. Will not interfere with normal operation of stand as it can be released by slight foot pressure on a conveniently located treadle.

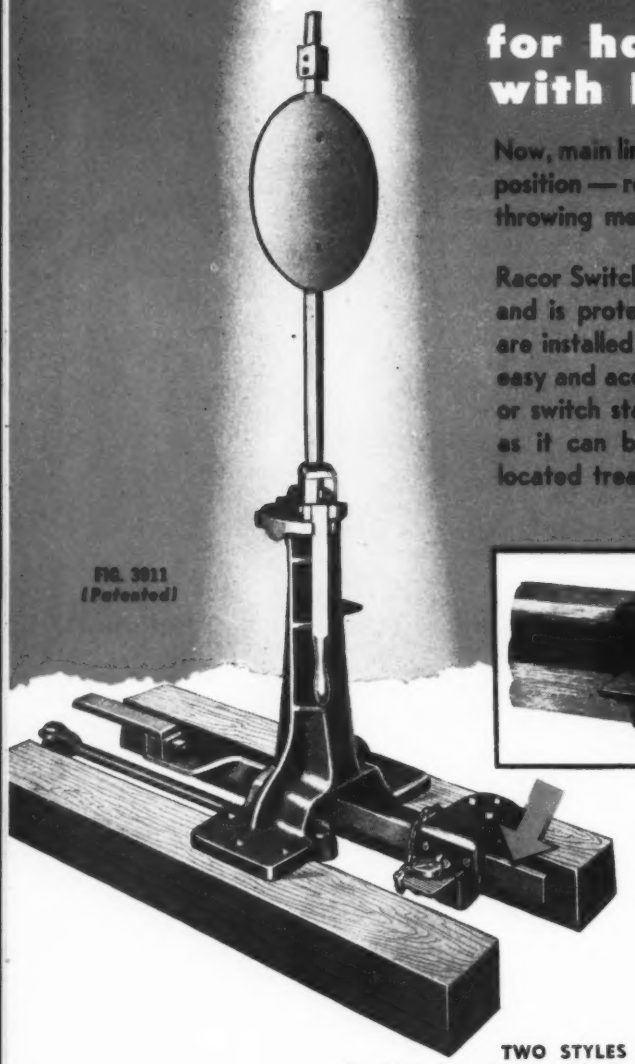
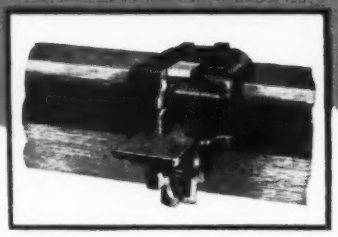


FIG. 3911
(Patented)



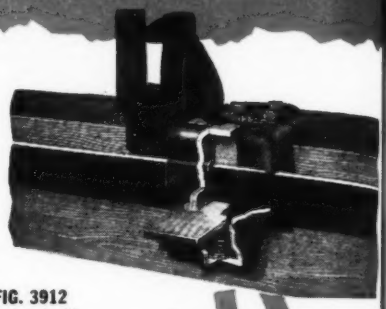
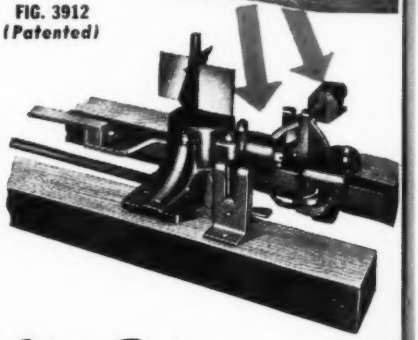


FIG. 3912
(Patented)



TWO STYLES AVAILABLE

Fig. 3911 above, for use with all types of column throw switches. Note how lockrod is securely engaged in lock treadle. Hand lever may also be padlocked if desired. Fig. 3912 at right, for use with all types of ground throw switches. On this type of lock, one padlock provides positive locking of both lockrod and hand lever.

Pioneers in the development and manufacture of

DEPTH HARDENED CROSSINGS	SAMSON SWITCH POINTS
AUTOMATIC SWITCH STANDS	VERTICAL SWITCH RODS
MANGANESE STEEL GUARD RAILS	REVERSIBLE MANGANESE STEEL CROSSINGS

World's most complete line of Track Specialties

Write Today

for your copy of our new and complete TRACK SPECIALTIES CATALOG

AMERICAN Brake Shoe COMPANY

RACOR

RAMAPO AJAX DIVISION

AMERICAN BRAKE SHOE COMPANY

332 So. Michigan Avenue, Chicago 4, Illinois

NEW YORK, N. Y.
HILLBURN, NEW YORK
NIAGARA FALLS, N. Y.
WASHINGTON, D. C.
ST. LOUIS, MO.
EAST ST. LOUIS, ILL.
SUPERIOR, WISCONSIN
DENVER, COLO.
PUEBLO, COLORADO
LOS ANGELES, CAL.
HOUSTON, TEXAS
SEATTLE, WASHINGTON
CANADIAN RAMAPO IRON WORKS LTD., NIAGARA FALLS, ONT.

Ramapo only has plants from coast to coast to expedite America's Railroad needs

Railway Engineering and Maintenance

Competition—

A Real Cause For Concern—Unless

Many in the engineering and maintenance departments are concerned about the future of the railways; about their positions or jobs—not today or tomorrow, but in the not too distant future. That, they may well be. Indeed, many more on the railways might well be concerned, because, confronted with outstanding technological developments in other forms of transportation, and a determination on the part of these competitors to capture a large part of their passenger, express, mail and freight traffic, the railways stand at a fork in the road—must make crucial decisions, and must be prepared to fight for their fair share of the transportation business of the future.

To consider only the threat of the airways may well give railroad men many sleepless nights, unless they are prepared to meet the challenge. And they can never contend that they did not realize the seriousness of that challenge, because it is being thrown at them almost daily in the press by the managements and enthusiasts of an industry that is showing imagination, aggressiveness and determination, unfettered by tradition. Consider for a moment only a few of the news statements about this industry during the last month.

Under the date line of January 16, the daily press told of the landing at Chicago's Municipal airport of the first of a new fleet of luxury airliners being built by one of the air lines, with ultra-modern accommodations for 57 passengers and crew. A day later, Robert Ramspeck, executive vice-president of the Air Transport Association, told a Washington group that the air lines are planning fleets of hugh super-airliners that will operate between major cities of the country virtually on trolley-car schedules.

Earlier in the month, the United Air Lines announced plans to start air freight service over its coast to coast and Pacific coast lines, and A. M. Burden, assistant U. S. secretary of commerce, told the annual convention of International Highway Builders in Chicago that the country will be using 400,000 planes by 1955.

These are but a few of the threats confronting the railways. Add to them the threat of increased competition by highway carriers, pipe lines, inland waterways and coastwise and intercoastal shipping, and it is only then that railway men can gain a true picture of what their industry is up against. Fortunately, railway managements are not frightened or dismayed by these threats, and are preparing to accept the challenge.

Only recently, speaking before the Traffic Club of Chicago, Wayne A. Johnston, president of the Illinois Central System, predicted that the railways will surmount their problems; said that they have possibilities which have never been fully explored; and continued that, "the one perfect solution to our problem is to keep our own service so good everywhere it can be profitably rendered that competition cannot possibly succeed."

We agree, but we insist that it will be necessary, and promptly, for the railways to explore fully those possibilities that "have never been fully explored," and that the job of keeping "our service" so good as to defy competition, must be accepted as the job of every employee, in every department.

The railways can look forward to a healthy and prosperous future, but that future will not result from pious good intentions alone. It will demand action on their part—bold action; half-way measures will not suffice. In this, those who build and maintain the fixed properties have a large responsibility, and they may well lie awake nights with concern about the future of the railways unless they, on their part, are prepared to outstrip the imagination, aggressiveness and determination of the railroads' competitors, and help stimulate the same kind of an attitude on the part of all other railway employees.

Fusees—

Have They a Place In Protecting Motor Cars?

WITH more than 50,000 motor cars on the railroads of the country, being operated in all kinds of weather and under a wide variety of operating conditions, including heavy curvature, adverse grades and dense traffic, it may be too much to expect that accidents involving these cars will ever be completely eliminated. On the other hand, every maintenance officer will agree that the large number of accidents involving motor cars that occur on the railways annually is inexcusable, and will continue a blot on the records of their departments until it is reduced materially.

That this class of accidents persists cannot be assigned generally to any inadequacy in the rules governing motor car operation on the various roads, because on most roads these rules appear to be adequate, even though some of them are not as specific as they might be with respect to flagging protection, and especially the use of fusees and torpedoes.

To those reading these comments, present reference in their rule books to the use of fusees and torpedoes may be perfectly clear, but if they will question other motor car operators on their lines, they are certain to find those who either lack a clear understanding of when it is their responsibility to use these forms of protection, or serious hesitancy on their part to use them because of lack of specific authorization and fear of the possibility of delaying following trains.

About a year ago, a motor car operator, traveling through a heavy-curved territory on a general downward grade was observed to drop a fusee on two occasions. Questioned in this regard, he said that although he was not authorized to do this, and although he had no report of anything immediately behind, he was taking no chances; in fact, that he had followed this practice in this territory for many years as a cheap form of insurance against accidents.

More recently, there was a foreman on another road who either refused or failed to employ fusees for protecting his motor car under similar conditions, even though he had fusees on the car and was aware of a following train an unknown distance behind. Today that foreman, unhappily, and two of his companions, are numbered among the missing. The following train caught up with them with the inevitable result.

In reporting this accident, the Bureau of Safety of the Interstate Commerce Commission calls attention to the fact that in the previous 23 months it had investigated seven other accidents involving collisions between trains and motor cars, which is an observation that cannot be overlooked lightly.

How many of these accidents could have been prevented by the appropriate and timely use of fusees is not stated, but it is not without significance that in reporting on the specific accident referred to, the Bureau pointed out that the motor car was equipped with the proper flagging equipment, including fusees, and that while the rules of the road do not provide specifically for the dropping of lighted fusees at intervals when a motor car movement is proceeding at less than normal speed in a territory where the view is obstructed, they imply that, when conditions require, fusees should be dropped at intervals by the crews of track motor cars.

How much uncertainty exists among foremen and other operators of track motor cars with regard to the proper use of fusees? Seems as though this question might well be investigated, looking to more definite instructions as to the use of this form of protection where any uncertainty exists.

Outlook—

Programs for 1946 Subject to Uncertainties

ALTHOUGH maintenance men had every reason to believe that the end of World War II would bring with it, reasonably quickly, an easing of the shortages of material and labor that plagued him during the war years, the prospects are that their expectations may not be fulfilled for some time yet. In fact, in some respects the uncertainties are even greater today than they were during hostilities, for then production was maintained at a high level and controls were in force that made it possible for the railroads to determine in advance with a fair degree of accuracy what proportion of their requirements would be forthcoming.

Consider the prospects for 1946 as they appeared to be at the end of January. Because of the nation-wide strike of steel workers, the production of steel—and consequently, of rail and accessories—is at a standstill. However, if the steel mills should resume operations at a reasonably early date—and there is reason to believe that they will—it is logical to assume that the effect on rail deliveries will not be too serious. On the other hand, the mills have tremendous backlogs of unfilled orders on their books, and even under the best of conditions it is not expected that they will be able to supply the railroads with all the rail that they would like to have for laying during the 1946 working season.

The prospects for filling crosstie requirements can best be described as spotty. Many roads hope to secure barely enough ties to make essential renewals, but on others a critical shortage is foreseen this year, largely because production in many areas has failed to rise substantially above the extremely low levels to which it fell during the war.

The man-power situation likewise continues to be a source of considerable concern. Contrary to earlier expectations, railroads in many sections of the country are continuing to experience difficulty in obtaining necessary workers to fill the gaps in the maintenance of way and structures forces. The reasons for this situation are many and complex, but in any event it is expected in many quarters that it will show at least some change for the better later in the year.

In view of the present situation with regard to materials and labor, maintenance officers will be confronted with many problems and uncertainties in planning their work programs for 1946. This would be unfortunate at any time; it is doubly so now when there is such an urgent need for carrying out large-scale programs to compensate for the heavy battering to which the properties have been subjected in recent years.

Under the circumstances, maintenance men will have

occasion to draw heavily on the skill and knowledge gained in maintaining the properties under war-time conditions. Especially will they find it necessary to be constantly alert to the needs of their properties to the end that available man-power and materials will be applied where they are most urgently needed. In the meantime, there are indications that the country as a whole may be nearing the end of the reconversion period, and that once this period has been left behind, improvements in the overall picture may occur with surprising rapidity.

Research—

Needs Help of the Practical Man

TOO often the word "research" is regarded as referring to a procedure that is confined to laboratories and is carried on only by highly-trained technicians of one kind or another, such as chemists, physicists or metallurgists. Actually, this word has a considerably broader meaning than is implied by this narrow interpretation. One dictionary, for instance, defines research simply as "diligent, protracted investigation," implying that this meaning holds regardless of the surroundings or conditions under which the investigation is carried on.

It is particularly important to keep this point in mind in any discussion of research as applied to the methods, materials or devices used in railroad maintenance of way work. Obviously, many investigations looking to improvements in this field must, initially at least, take place in the laboratory. Studies of the metallurgy of rail constitute an example of this type of research. On the other hand, there are other investigations that are, of necessity, initiated and carried to conclusion under actual service conditions, entirely without the aid of the laboratory technician. Indeed, even where the work is started in a laboratory it cannot be regarded as being completed until the findings, in whatever form, have been tested in the field.

The point to be made is that the practical maintenance man need not—in fact, should not—regard himself as a mere bystander with regard to the research that is carried on for the purpose of improving the materials and appliances that he uses in his work. Initially or ultimately, all investigations for this purpose must have the benefit of his knowledge and experience; in the final analysis he is the man who decides whether the changes proposed as the result of research projects are capable of meeting the final test, that is, of performing satisfactorily under actual service conditions.

That the truth of these statements is recognized in high quarters is evidenced by comments made by J. B. Akers, chief engineer, Southern, in an article on research that is published elsewhere in this issue. Time and again in his remarks Mr. Akers finds occasion to express the conviction that, to be successful, research must have the benefit of careful field observation by practical men.

In a sense, every piece of railroad property, whether it is a stretch of track, a bridge, a building, or a device or machine, may be considered to be part of a research project in which the objective is to observe the performance of the unit in actual service and to determine whether any improvements can be made that will enhance that performance. Any man who is directly or indirectly responsible for the upkeep or operation of the particular unit should consider himself to be a qualified "research technician," with the responsibility of recommending any improvements that he may find necessary or desirable in the interests of greater efficiency and economy.

Cleaning Ballast—

Will Greatly Improve Track Conditions

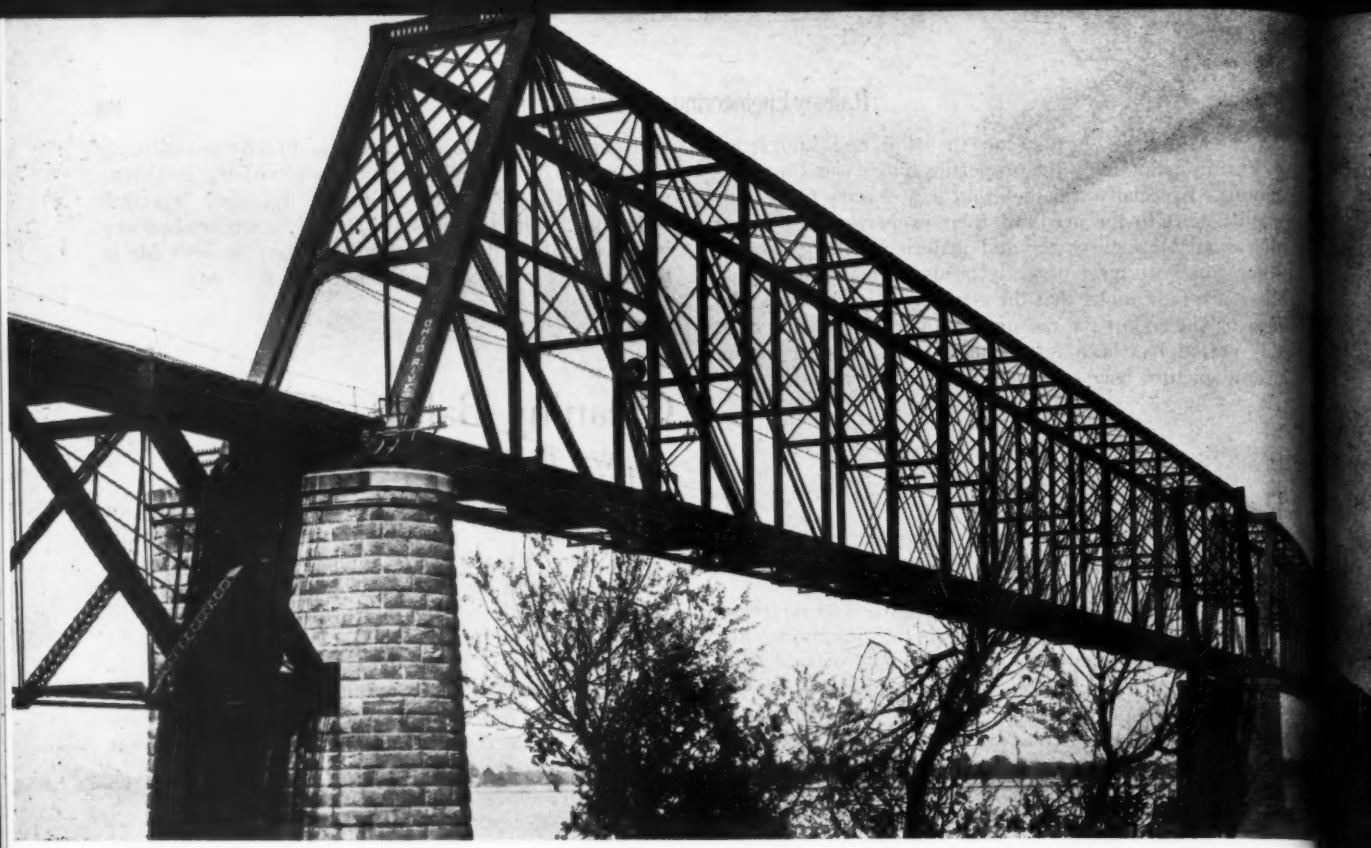
ON the assumption that the present industrial strife can be settled and the production of essential materials started, the railways are planning large programs of maintenance with the purpose of catching up on some of the deferred maintenance that accumulated during the war as the result of shortages of men and materials. This means that, if it can be secured, more rail will be laid during the present year than was laid in any year since 1930, and this in turn indicates that ballasting programs will be correspondingly larger than in any year during the same period.

Relatively, during the depression years and continuing through the war period, deficits in ballast were fully as large, if not larger, as those in rail. In fact, during some of the depression years, little more than 10 per cent of normal ballast requirements were met; and during the period of the war the actual application of ballast averaged around 30 per cent of normal needs, although traffic was at an all-time maximum.

As a result of these continued deficits there is a pressing need on most roads for larger programs of ballast renewal and of additional ballast programs that must extend over a number of years. It is axiomatic that good track cannot be maintained on poor, worn-out or dirty ballast, or where there is an insufficient depth of ballast to distribute the superimposed loads. In fact, too little material under the ties tends to destroy the ballast, regardless of its original quality. Besides this, where there is insufficient ballast, the ballast pounds down into the subgrade, thus starting water pockets.

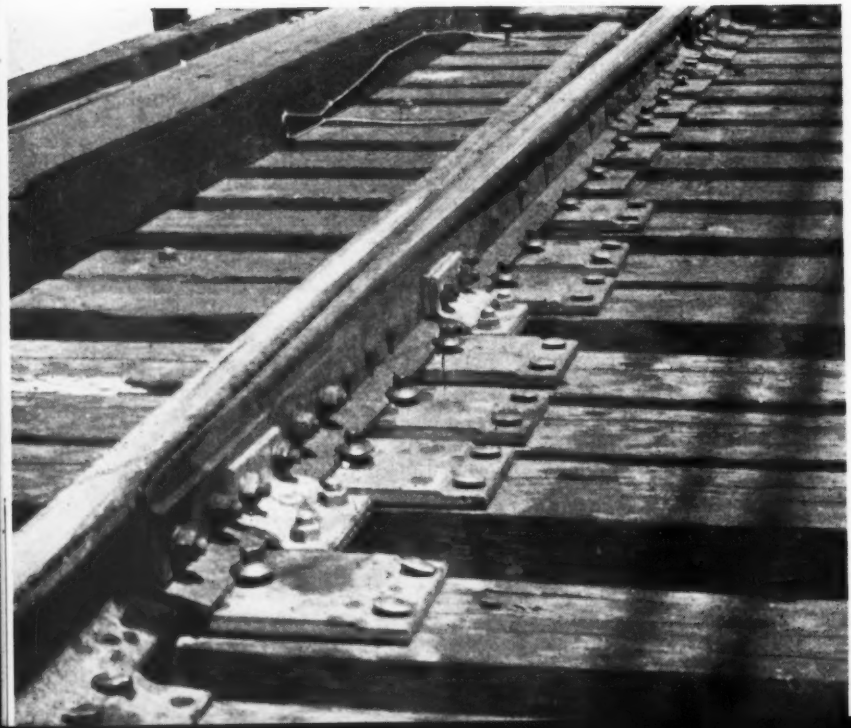
Although trackmen have always been aware of the advantages of cleaning ballast, the practice did not become widespread until simple and effective machines for doing the work were developed, since which time many hundreds of miles of ballast have been cleaned that would have been discarded if cleaning it had remained a manual operation. While this has offset some of the overall deficit, it amounts to only a small percentage of the total needs.

Obviously, if ballast is to be cleaned, this should be done prior to the application of new ballast, whether this application is for replacement or is intended as additional ballast. When laying rail, if the ballast needs cleaning, this should be done and the track should be lined and surfaced before the new rail is laid. No raise is required at this time, however, as it is better to reserve this until the new rail is ready to be surfaced. If this practice is followed, both the rail and the ballast will be easier to maintain in good condition and for a longer time than if cleaning and surfacing in preparation for the new rail are omitted.



ILLINOIS CENTRAL

Overcomes Adverse Conditions



AS POINTED out in Part I of this article, the Illinois Central was confronted recently with two track problems on its long bridge over the Ohio River at Cairo, Ill. One of these problems, which was discussed in Part I, was the severe and uneven cutting of the tie plates into the ties on the long curved south approach to the main river spans, not only destroying the ties prematurely, but, of greater concern, resulting in increasingly serious wide track gage on the approach.

The other problem, which is discussed in this part of the article, was confined primarily to the river spans, and consisted of the pounding of wheel loads at the rail ends. Briefly, this latter problem was overcome by replacing the old well-worn 90-lb., 39-ft. rails on the river spans with a

Close-Up View of One of the Expansion Joints on the Bridge Before the Inner Guard Rail Was Replaced

General View of the Ohio River Bridge of the Illinois Central at Cairo, Ill., and (Above Right) A View Along the Deck

This installment describes how the Illinois Central overcame rail joint impact on its long bridge over the Ohio river at Cairo, Ill., by replacing the existing worn 90-lb. rail with new 112-lb. rail, pressure butt-welded into continuous lengths up to 1,058 ft. Part I of the article, published in the January issue, described the installation of Fabreeka pads beneath the tie plates on the long south approach to the bridge to stop severe plate cutting of the ties and the resulting tendency toward wide track gage.

on Cairo Bridge—Part II

series of continuous pressure butt-welded rails, up to 1,058 ft. length, which are separated by switch-point-type expansion joints to take care of the expansion and contraction in the various spans.

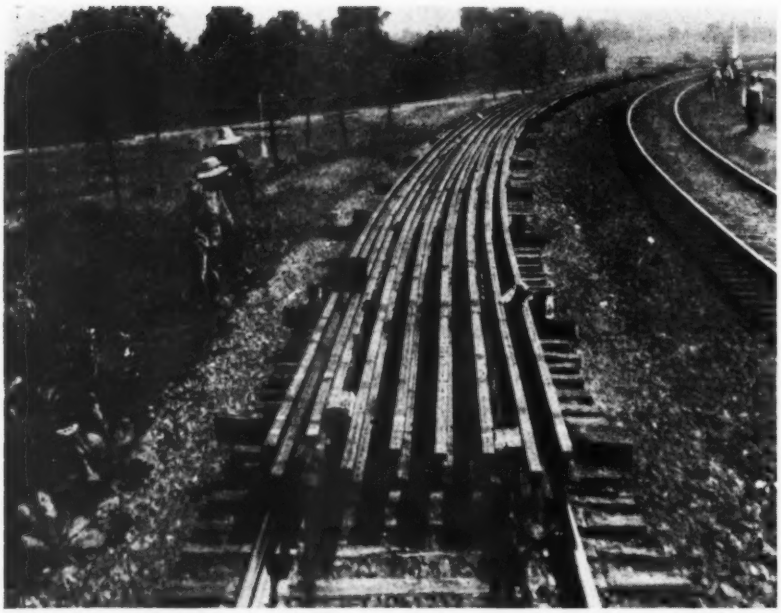
The Cairo bridge, which extends in a generally east and west direction between Illinois and Kentucky, is an 11-span truss structure, with nine main through-truss river spans and two flanking deck-truss spans at the ends. Of the through spans, seven are 400 ft. long and two are approximately 518 ft. long. With the end deck-truss spans, each of which is 250 ft. long, the structure as a whole has a length of 4,393 ft. It is with this length of the structure, independent of its approaches, that this part of this article deals.

The laying of long lengths of continuous butt-welded rail on the river spans was carried out entirely independently of the work on the south approach. In the relay operation, new controlled-cooled, 112-lb. RE rail, with beveled ends, was installed on double-shoulder tie plates, and was single spiked, whereas the old 90-lb. rail was supported on single shoulder plates, and likewise single spiked. Altogether, 16 continuous rails were laid on the bridge, ranging in lengths from 487 ft. to 1,058 ft. 6 in., the various lengths being determined by the arrangement of fixed and expansion shoes supporting the various spans, and by the arrangement of signal block joints on the bridge. Altogether, a total of 202 rail welds were involved.

Six expansion joints were provided in each line of rails across the 4,393-ft. length of the bridge, each of these being of the switch-point type and involving a 16-ft. 6-in. switch point, a 39-ft. stock rail, and the usual arrangement of plates and braces. Each of these points provides for the maximum possible adjustment in rail and span lengths due to temperature changes.

Conditions immediately at both ends of the bridge being unsuited for carrying out the rail welding, it was decided to do this work in a small, little-used yard at Mounds, Ill., about six miles north of the bridge. Here, the yard, with four tangent tracks, lay immediately west of and parallel with the southward main, and was separated from it by only a siding—the four yard tracks being numbered 1 to 4, consecutively, from the siding.

The pressure butt welding of the rails, which was done with the equipment of the Oxweld Railroad Service Company, and under its supervision, was carried out on track No. 4, in accordance with the usual practice and set-up employed by that company for this class of work. The first eight continuous lengths welded were of varying lengths, worked out on the basis of laying them consecutively across the bridge from west to east. As each of these rails was completed, it was lined across Tracks 3 and 2 and directly onto skid ties set up on Track 1—these skid ties to be used subsequently in moving the rails to the bridge. The next eight lengths of continuous rails produced, likewise in order according to their position on the bridge from north to south, were then lined over onto tie blocking on yard track No. 2.



The Strings of Welded Rails Were Moved More Than Six Miles to the Bridge

In the plan for transporting the rails to the bridge, eight were moved at a time, supported on the skid ties, and were hauled by a steam locomotive. The skid ties were ordinary crossties, but each was equipped on its bottom face with two skid plates, one for each rail. These plates were fastened to the ties by four cut spikes, and each was provided with a lug 3 in. long by ½ in. deep, welded in place, to act as a flange in guiding the ties along the track. Furthermore, the plates were so placed as to provide a gage of 56 in. between lugs, and the heads of the outside spikes in each plate were cut off flush with the faces of the plates to prevent their interference with the movements to be made through turnouts.

The skid ties in each rail set-up varied in total number and spacing according to a plan to limit the weight on each tie to approximately 4,000 lb. On this basis, the ties were spaced as close as 20 ft. apart at the head end of the set-up, where they supported all eight rails, and as far as 50 ft. apart at the rear end, where they supported only two or more of the longer rails. All of the rails were double anchored at each skid tie to hold the ties in place during the move.

Both moves were made without difficulty, through the yard switches and out on the main line. The first pull from yard track No. 1 required movement through two No. 10 turnouts, while the second pull, from yard track No. 2, required movement through one No. 8 turnout and two No. 10 turnouts. On the main line, the pulls had to be made around curves up to 5 deg. and up the north bridge approach grade of 0.4 per cent.

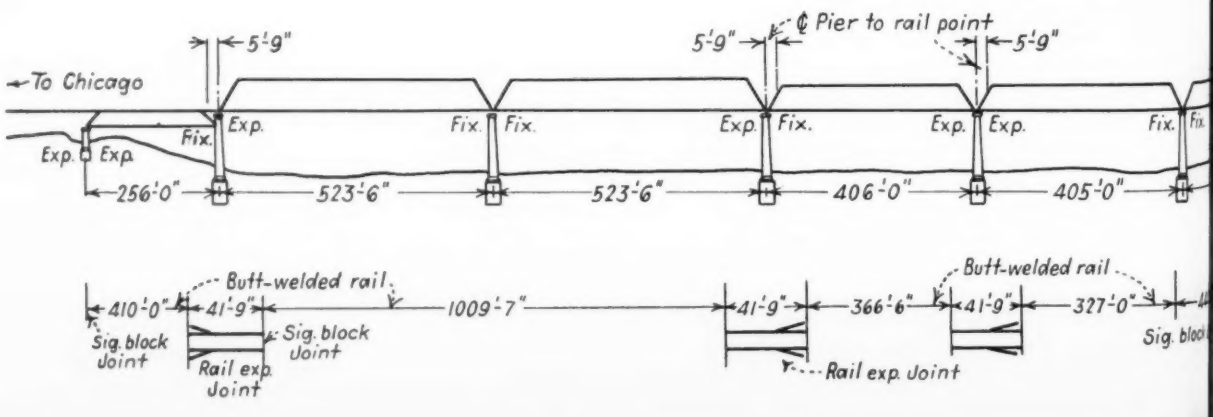
To reduce friction between the slide plates and the running rails, the rails were oiled at four points continuously throughout the moves by means of dripping oil pails set up on the ends of certain of the skid ties. The first oiling was done at the second and third ties, while the other two points of oiling were spaced back further along the rails. A motor car with a supply of oil moved along on the opposite main, carrying a workman who replenished the oil in the oiling pails as required. Both moves were made at a speed of 3 to 4 m.p.h., covering the six miles to the bridge in approximately two hours' time.

Installation

As the first group of rails was pulled up on the bridge, it was stopped so that the first rails on each side could be lined off between the running rails and the timber guard rails, directly opposite their final positions on the track. Then the remaining rails of the group were pulled ahead and subsequent pairs were lined off to their respective positions outside the running rails.

For the second pull of eight rails, the skid ties used in the first pull were returned to Mounds yard and were placed under the rails, already up on blocking in proper arrangement, on yard track No. 2. When moved on the bridge, this group of rails was unloaded in order, as were the rails on the first group, and then the stage was set for changing out the old running rails.

In the latter work, which was done one long rail at a time, between trains, the first step was to pull the outer row of spikes holding the old guard rail; then to break the joints in this rail by burning off the nuts with an acetylene torch; and then, employing a rail crane, to set these rails out on the adjacent walkway, one at a time, in the clear of the track. Following this and simultaneous thinning out of the spikes holding the running rail, the remaining spikes holding the running rail were pulled; the old 90-lb. rail was



lined inward to form the new inner guard rail and was skeleton spiked; the old single-shoulder tie plates were thrown out onto the adjacent walkway; the old spike holes were plugged with creosoted tie plugs and their protruding tops cut off; the new double-shoulder tie plates, with a 1 in 40 cant, were placed and lined up; and then the continuous length of welded rail was lifted progressively over into place by the rail crane and was spiked in position. Where the upset metal on the underside of the base at welds fell between ties as the rail was laid, it prevented no problem, but where this fell directly on ties, special tie plates were used, each with a rectangular slot cut through it to accommodate the downward projecting metal.

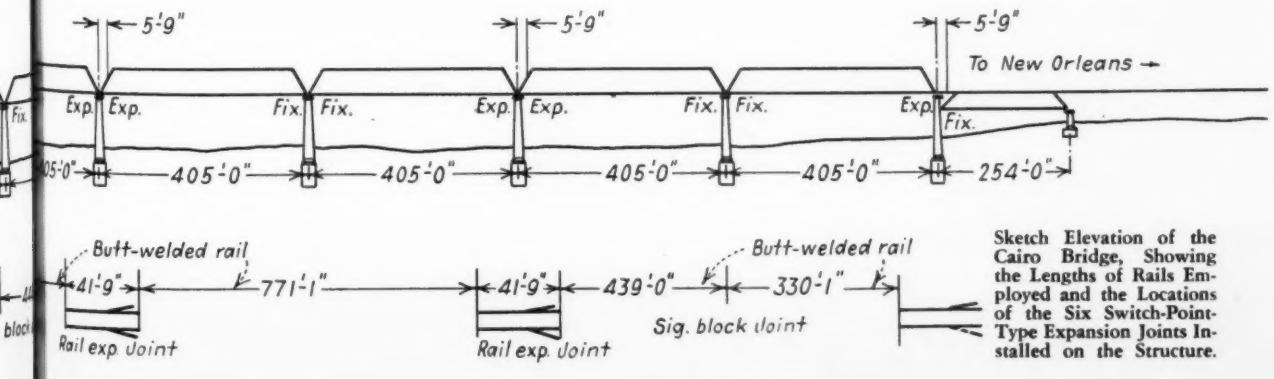
Immediately after the new rail was in place, 12 Improved Fair rail anti-creepers were applied to each 39-ft. length of the rail, 6 against movement in each direction, and equally spaced along the rail. Subsequently, after traffic was restored to the bridge, all finishing-up operations were completed. Note that no adzing of the new tie plate seats was done, as this was not required by the condition of the old seats or the size of the new double-shoulder plates.

During other intervals between trains, the switch-point expansion joints and other lengths of continuous rail were installed, until the entire work over the bridge was completed. Throughout the work, the crane cleared all train movements by running to Illinois Junction at the west end of the bridge. Except for the crane, all of the work was done with hand tools, and the only man in the gang with unusual duties was one who was assigned to watch for any fires that might be started as the result of the use of the acetylene torch in the removal of the old guard rails.

Completion of the rail change on the bridge brought about all of the results anticipated, with the complete elimination of pound and impact at the former rail joints, and with the expectation that the new rail will far outwear the rail it replaced.

The work of installing the welded rail on the Cairo bridge was planned and carried out under the general direction of C. H. Mottier, vice-president and chief engineer of the Illinois Central System, C. M. Chumley, engineer maintenance of way, and G. M. O'Rourke, assistant engineer maintenance of way. The actual work was done under the immediate direction of C. I. Van Arsdalen, division engineer, and A. A. Witter, supervisor of track, both with offices at Carbondale, Ill.

Eight of the Continuous Rails Were Moved at a Time



Sketch Elevation of the Cairo Bridge, Showing the Lengths of Rails Employed and the Locations of the Six Switch-Point-Type Expansion Joints Installed on the Structure.

Progress Through *Maintenance*

This article, an abstract of an address presented recently before a meeting of the Metropolitan Maintenance of Way Club, reviews many developments in maintenance materials and methods brought about by research, and also points out many problems that remain to be solved. To achieve best results from research, the author appeals for careful observation and reports on the part of practical maintenance men in the field, both on the results of service tests and on current maintenance problems, in order that research may be directed constantly toward solving the most important problems in the maintenance field.

THE railroads have been complimented on all sides, and properly so, for a job well done during war-time, but now comes a new competitive era and we must face it squarely with improved service all down the line. Engineering research will help us do that by enabling us to develop better materials and better ways of doing our work.

If there is no research, we will have slow development, similar to that which took the human race thousands of years to develop the simple wheel and level principles, both of which are basic in about everything we do today. Perhaps these and many other things would have developed sooner if there had been sufficient demand for them and the research that brought them into being.

Today, although research has been greatly accelerated, it still takes us too long to recognize our troubles for what they are. Part of our trouble lies in the lack of a crystal ball. If we had one, and could look into it and see what the future holds, we would then have a better basis for planning for the future. Having no crystal ball accentuates the need for observation and planning on our part. In years past, much of our development has come from the observations and suggestions of practical maintenance men. In the future, we must have more research, combined with closer observation and more suggestions concerning current problems from practical men in the field. This will enable us to get accurate information on service tests more quickly and to re-orient our research constantly toward solving the most pressing problems that are facing us today.

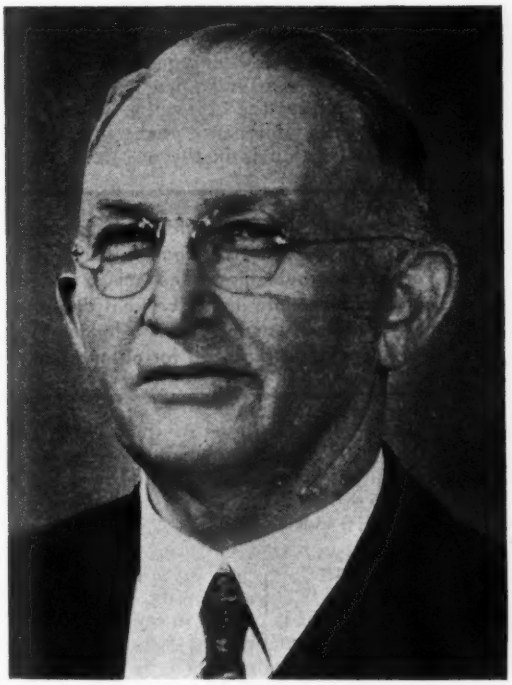
About 125 years ago our rail was nothing more than a wooden stringer, but was improved by laying a strip of metal on top of it, because some track men of that day observed that the wood wore out rapidly. The strap rail was an improvement, but didn't last long. About 1835, the rail as we now know it began to develop rapidly and assumed an approximate "T" shape in a matter of 10 years. This change came about because of reasons advanced by practical, observing maintenance men of that day. In the 1860's steel for rails was made available, and since that time the shape of our rail has changed very little, although engineering research and development have made it a stronger, better member of the track.

More recently, the average weight of rail in tracks has steadily increased from 85 lb. per yard in 1924, to 92.3 lb. in 1934, and to 98.1 lb.

Problems yet to be Solved Include (Left to Right Below) Shelly Rail, Checking and Splitting of Ties and Driver Burns

Research—

Men Must Help



By J. B. AKERS
Chief Engineer *
Southern Railway System

per yard in 1944. While increase in weight of rail is desirable, that alone will fail to accomplish all that seems necessary. The development in rail has by no means come to an end. Observations by track men of results in service will bring further improvement.

Today, we have the controlled-cooling process which has eliminated transverse fissures, but we still have other troubles, involving both the chemistry and physics of steel rails, which must be overcome. Any kind of deformation of rail in service is undesirable. We cannot prevent curve wear, but we can slow the process by lubrication. Furthermore, hard as our rail is, it cannot withstand the heavy loads of today without flow of metal. This presents a problem which should be solved, if possible, because the displaced metal loses its ductility, cracks appear in it, and the rail becomes ragged. Such rails, besides being unfit for service, cannot be tested by detector cars. We see so much of this condition that it is part of the scenery on most roads, but there is large loss here. It is a knotty problem for metallurgical research, and its solution is worth a high price. Someone must develop a hardening and toughening agent which will not leave the rail brittle; or perhaps modify the head shape to accomplish the desired result.

*At the time this address was presented Mr. Akers was assistant chief engineer. His promotion to chief engineer on February 1 is announced in the news columns of this issue.

At the present time we have shelly rails, but have recognized them as such for only a very few years. Such rails usually develop on the outer sides of curves, but occur in tangent track as well. A committee of the American Railway Engineering Association is working diligently to find out why shelly spots occur and how they can be prevented, but no answer has been found as yet. Some think they may be due in some manner to present mill practice; others assign metal flow as the probable cause; but whatever the cause, the bright glare of engineering research should be turned on it, through the medium of metallurgy.

On some railroads shelly failures, with their irreparable damage to the top surface of the rail head, from which the steel comes out in rather large slivers, require the renewal of rails in a year or two. One disturbing result of this defect is the formation of transverse cracks, which have their origin in a horizontal split at the bottom of the shelly spot. Then we have a defect under shelly spots which some call a compound fracture, while others call it a progressive fracture. These grow just as any transverse fissure will grow and may develop before there is any surface indication. This condition is about as dangerous as the true transverse fissure and the only way to locate such defects is by means of the detector car. The development of a method to eliminate such defects through engineering research will challenge our best brains.

In time, research on rail must also obviate the horizontal split head, known to be a mill defect; slag inclusions, which may result in the formation of something difficult to distinguish from the true transverse fissure; and head checks, which seem to be due to traffic conditions, but the answer to which may be found in the improvement of running gear, as well as in the chemistry of rail steel.

More recently, research has shown that excessive stresses sometimes occur in the upper fillets and in the web of the rail, and that an increase in the web thickness and in the radii of the fillets may be desirable. Suggestions for improvement have been made, and in one case are being followed experimentally by the use of the torsion-resisting rail developed by the Chicago, Burlington & Quincy. Other designs to correct this trouble are being perfected by

the American Railway Engineering Association. These changes in rail section may be adopted after a period of trial, but only after sufficient tests in service under the observing eyes of practical maintenance men. Other experimentation is in the nature of changes in the shape of the ball of the rail, through which it is hoped to minimize metal flow, and perhaps have some effect on the formation of shelly spots.

"Today, although research has been greatly accelerated, it still takes us too long to recognize our troubles for what they are. Part of our trouble lies in the lack of a crystal ball. If we had one, and could look into it and see what the future holds, we would then have a better basis for planning for the future. Having no crystal ball accentuates the need for observation and planning."

Special Trackwork

More development is needed in the repair by welding of manganese castings in special trackwork, such as crossings and frogs. True, technics today are better than they were, but there is still much to be desired in the results obtained. Two substantial tests to develop improvements are now in progress on the Chicago, Milwaukee, St. Paul & Pacific and on the Toledo Terminal, under the auspices of the Committee on Track of the American Railway Engineering Association. Special castings are being used to determine the effect of different welding currents, and the size and chemistry of electrodes. This work on the repair of manganese castings is indicative of the need for more knowledge on special welding technics. The same statement is true of the repair of heat-treated crossings. This research is for the benefit of the industry, and those in charge of it are greatly dependent on practical track men for observation of the effectiveness of the methods followed.

Another investigation is in progress to determine the practicability of building up locomotive wheel burns on rails in track. We have many burned rails in service, and it seems that such rails must be removed from track or built up in some satisfactory way. If not removed, there is the likelihood of transverse fractures developing beneath the burns, which may spread and cause final failure. Results thus far indicate that engine burns can be built up successfully, and that we can thereby continue in service a large amount of rail that otherwise would have to be removed.

Although we have been uncertain for years as to the proper design and size of tie plates, research is now in progress to bring out definite knowledge in this regard. True, we have a better idea today than ever before on the design of such plates, but if one makes a trip over some of the trunk line railroads, he will observe that tie plates are cutting into the ties badly, or that the rail is turning either inward or outward. You know what results when the rail begins to turn. It cannot turn much before we must level it up by adzing the ties and then restoring the track to proper gage, line and surface.

The uncertainty concerning tie plate design may be realized by some figures. The 112-lb. RE rail section was adopted in 1934, and since that time the steel mills have cut rolls for 127 tie plate designs for this section, varying by fractions of an inch both as to width and length, while dies for 288 different punchings were required for the same tie plates. For the 131-lb. and 130-lb. RE rail sections, which have the same base width, there are 52 different tie plate sections, with 97 different punchings. A study is now in progress by the mills and the railroads looking to a material reduction in tie plate sizes and punchings.

It is not because of size alone that tie plates cut so badly into ties. On the Southern, for example, we have one design of 12-in. tie plate in service which cuts the ties badly on the gage side, and another 12-in. tie plate which gives far better results. The only practical difference between them is in their eccentricity—a simple thing when the proper amount is determined, but elusive while you are searching for it. We need more study and observation for the further development of effective tie plates, as well as for methods of fastening the tie plates more securely to the crossties.

The Crosstie

The humble crosstie, which we all use by the thousands, is very scarce at present, a fact that is undoubtedly having its effect on your present work. Although we buy good crossties, and they are well treated against decay, there is still a serious fault in the tie, in that it is either too soft or checks and splits badly. The checking and splitting are very serious, because, as you know, they are responsible for the removal of many ties which are otherwise sound. I cannot help but believe that it is only a matter of research to determine what to do to tie timber to retard this tendency.

Checking and splitting are mechanical in character, and occur during the seasoning process. Our present way of combating such failure is to drive in "S" or "C" irons. You know how effective they are, and that a great many of them fall out after a few years' service in track. I am confident that the answer can be found through research in co-operation with the wood preserving companies. The industry which has produced laminated timbers that can be bent to any form, and which knows so much about the chemistry and physics of wood, can work out a satisfactory answer to the checking and splitting of ties. The lack of such an answer results in enormous waste.

Perhaps a solution may be found in a rapid drying process recently developed by one treating plant, in which they can take a green, unseasoned tie, dry it in a few hours to a proper moisture content for treating,

"I know of no subject more challenging to us than improvement of materials and methods through research and development. If we fulfill our simple obligations to our employers, we will devote ourselves to it in a comprehensive way."

and then proceed with the creosote treatment while the tie is in the same cylinder. An oak tie can be thus dried in about eight hours and, since it is then thoroughly heat-conditioned, the plant can go ahead with the creosoting procedure. The entire elapsed time is only from 15 or 18 hr.

Stabilizing Roadbed

Many extensive investigations are being carried out for the purpose of improving roadbed conditions. Most railroads have been lax in the study of soil mechanics, and it is fortunate for us that the public roads organization of the United States Government has been conducting research in this important field. We formerly thought that fills could be constructed only of material as tak-

en from adjoining cuts. The highway engineers have shown us that this is not altogether true, and that treatment can be administered that will materially improve conditions. A highway soils engineer made an investigation of a fill on our railroad. This fill was built before the Civil War and was one with which we have worried for many years. He told us the material should never have been used unless a certain treatment had been administered.

Grouting Study

A study of the methods and results of roadbed grouting is now being made by the research engineer of the Association of American Railroads. The Atchison, Topeka & Santa Fe, the New York Central and other roads have engaged in roadbed grouting on an extensive scale. The soft spots, commonly called water pockets, in track on the New York Central, for example, are little if any different from those found in the tracks of all railroads, and occur in all types of roadbed sections, including deep cuts and high fills. The soil in the roadbed in these areas generally consists of soft clay, silt or other material which will retain a large amount of water, with the result that it has a relatively low bearing capacity. Due to this, the ballast is driven into the subgrade under the impact of traffic, and water pockets result. What have we done about it? Sometimes we drive "squeezer" piles, sometimes we drain the pockets, and sometimes we remove the material and replace it with better material. We may expect a large increase in the work done to cure soft spots in track.

Other Subjects

There are many other things that could be discussed, including the proper treatment and care of rail in road crossings and tunnels; the possibilities in the use of more work equipment, including the use of off-track equipment, which is growing by leaps and bounds. Practically all of our ditching and earth-moving work is now done with such equipment, and in a very effective way, but there is still room for great improvement. Nor has the continuous welding of rail been mentioned. The first tests of this development are now several years old, and you can expect to hear much more about this class of work in the years to come. I am not so sure but that the answer in continuous welding is already at hand, but one of the first requirements in our kind of work is to be sure that safe conditions prevail, and it is taking us some time to convince ourselves of the complete safety of continuous welded rail in all its aspects.

I know of no subject more challenging to us than improvement of materials and methods through research and development. If we fulfill our simple obligations to our employers, we will devote ourselves to it in a comprehensive way.

N. & W. Makes Its Annual Track Awards

ACCORDING to the results of its annual track inspections, made late in 1945 by committees of general and division officers, the tracks of the Norfolk & Western were maintained in a high state of excellence during that year. It was found that the average track rating for Group "A" track on all divisions was 96.2 out of a possible score of 100, an improvement of 0.6 over the 1944 score. The improvements shown in Group "B" and Group "C" track were 0.3 and 0.5, respectively.

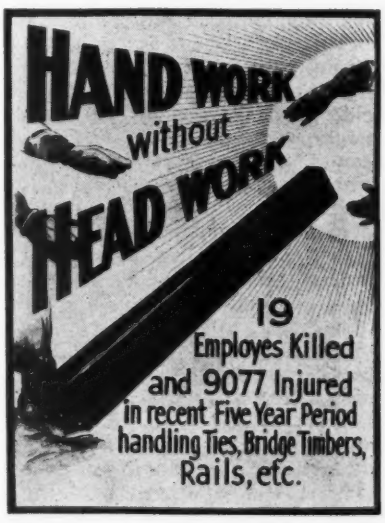
The new method of making inspections and ratings, adopted in 1944, was continued in 1945. In these, the N. & W. used the gyro inspection car owned by the Chesapeake & Ohio, and track ratings were established partly on the basis of recordings made by the car and partly by the visual inspection of roadmasters who accompanied the car—the recordings contributing 70 per cent of the total score and the visual inspection 30 per cent. The car rated the following track conditions: rail joints, track alinement, cross level and superelevation, and track surface.

Among the company's five divisions, the Norfolk division repeated its 1944 record of heading all divisions, with a new high of 97.5 for Group "A" track. This was an improvement of 0.8 over the division's 1944 rating. The Radford division again was a close second with a score of 97.1. Two roadmaster's districts of the Norfolk division led the roadmaster's districts, with district No. 3 winning a rating of 97.54 and No. 2 achieving a rating equivalent to 97.52.

In accordance with past practice, the road awarded cash prizes to the track foremen whose territories held first, second, third and fourth places on the different districts. A total of 82 section foremen received such prizes, which included 21 first prizes, 24 second awards, and 19 and 18 prizes for third and fourth places, respectively.

Among the section foremen, the winner of the highest rating for the best maintained track was F. P. Combs, of Rural Retreat, Va., whose rating was 98.82. In addition to Mr. Combs, who placed second in 1944 for top honors, eight other section foremen received rating of 98 or higher in the 1945 inspection. They were: F. L. Garrett, Briery, Va.; J. R. Jamerson, Prospect, Va.; H. B. Cralle, Evergreen, Va.; L. W. Morris, Disputanta, Va. (also a 1944 winner); L. G. Fainter, Stuarts Draft, Va.; J. E. Jennings, Midvale, Va.; C. A. Peak, Chilhowie, Va.; and B. H. Tinsley, Roanoke Terminals, who is now assistant roadmaster on the Radford division.

Prize-winning section foremen whose territories showed the greatest improvement during the year were: Mr. Jennings, whose score was 3.71 points better; Troy Hardin, Vedra, W. Va., 2.92 points improvement; and A. D. Early, Vicker, Va., 2.13 points better.



This Poster, No. 269, Constitutes the February Installment of "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

Train Overtakes Motor Car—Three Die

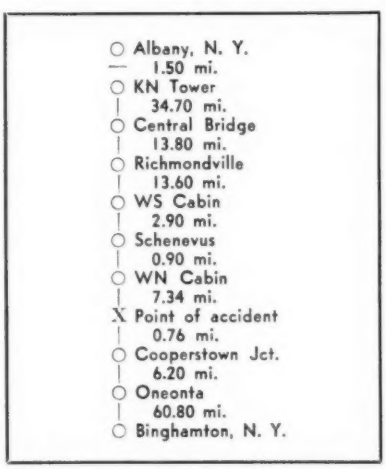
THREE men in a bridge and building department paint gang were killed and one was injured in a rear-end collision when the track motor car on which they were riding was overtaken by a freight train on the Delaware & Hudson near Cooperstown Junction, N.Y., on October 30, 1945, because of failure to afford the motor car adequate protection. The accident took place in double-track territory about 4:55 p.m., and while it was approaching dusk at the time it occurred, the weather was clear.

The accident occurred on that part of the road between Albany, N.Y., and Binghamton, about 75 miles south of Albany and 0.76 miles north of Cooperstown Junction, while the motor car was traveling southward on the southbound main. Immediately approaching the point of accident from the north there are 717 ft. of tangent, which is followed by a 3-deg. curve to the right, which extends 1,617 ft. to the point of accident and 122 ft. beyond. The grade at this point is 0.38 per cent descending southward.

Had Line-Up

In its report on this accident, from which the facts in this article have been abstracted, the Interstate Commerce Commission pointed out that the paint gang involved, which consisted of a foreman and three men, had been engaged earlier in the day in painting a bridge at a point about 39 miles north of the point of accident, and that at the time of the accident was proceeding on a track motor car, which was hauling an empty trailer, from the point of work, south to Oneonta, N.Y., 6.2 miles south of where the accident occurred. About 3 p.m., the train dispatcher authorized the foreman to proceed south from Central Bridge, about 38.5 miles north of the point of accident, to Oneonta, a distance of 45.5 miles. The motor car, which was being operated by the foreman, passed Extra 536, southbound, at Richmondville, N.Y., 23.7 miles north of the point of accident, where the extra was performing switching service, and continued southward. About 4:05 p.m. the foreman called the dispatcher by telephone from WS cabin, about 11 miles north of the point of accident and 13.6 miles south of Richmondville, and secured permission to proceed. At this time the dispatcher informed the foreman that Extra 536 was 7 miles north of WS cabin.

At 4:20 p.m. the foreman called the dispatcher from WN cabin, 8.1 miles north of the point of accident and 3.8 miles south of WS cabin, and again secured permission to proceed. At this time the dispatcher informed the foreman that Extra 536 was 5.9 miles north of WN cabin and would perform switching service at Schenevus, 0.9 miles north of WN cabin.



Showing Location of the Accident Relative to Nearby Points

The motor car then proceeded south, and about 4:55 p.m., while moving at an unknown speed, was struck by Extra 536, which overtook it while operating at a speed of about 40 m.p.h., the maximum authorized speed in this territory. Train operation in this territory is protected by automatic block signals, but no protection was afforded by the signals to the motor car and trailer since both were insulated.

The engineman was maintaining a lookout ahead as he approached the point of accident, and first saw the motor car when about 400 ft. away from it. He immediately applied the emergency brake and sounded the alarm whistle signal, but the accident occurred before the speed of the train was reduced materially. Because of the track curvature in the territory involved and an embankment about 25 ft. high on the inside of the curve, the view from the locomotive was materially restricted.

In the accident the trailer was detached from the motor car and was demolished, and the front end of the locomotive was slightly damaged. Three men in the gang were killed and the other man was injured. The motor car continued south unattended and collided with a cut of cars at a point 8.66 miles south of the point of accident and was badly damaged.

In discussing this accident, the Commission stated that in the 23-month period immediately preceding the date of the accident, it had investigated seven other collisions between track motor cars and trains.

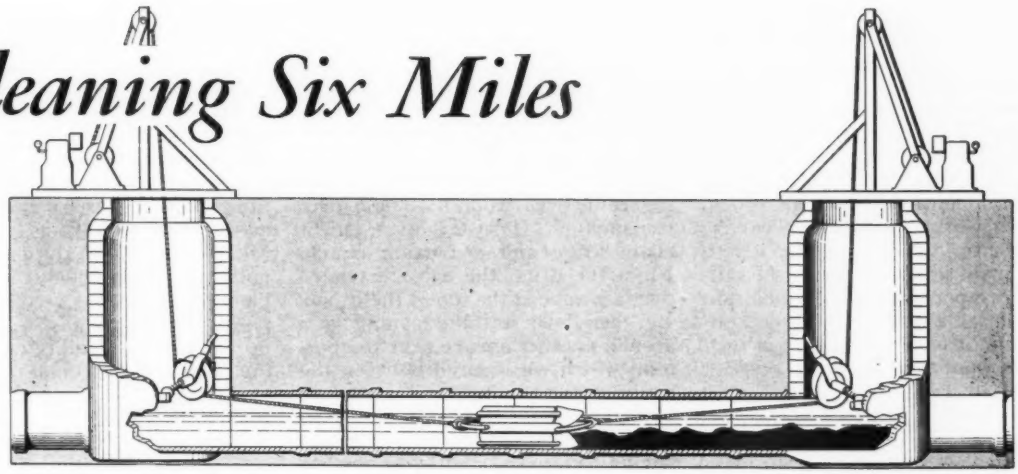
In the case of the accident on the Delaware & Hudson, the movements of track motor cars are authorized orally by train dispatchers, and an oral line-up of the movement of trains within a limited territory is given the operators of such cars. Train crews are not given information about line-ups authorized to motor-car operators. The rules for the operation of track motor cars provide that trains other than those mentioned in a line-up may be operated at any time without notifying motor-car operators, and that motor cars must be protected by their crews at all times. Such protection consists of visual observation in both directions by the operators of motor cars and by flag protection.

In the case of the accident in question, since the motor car and trailer were insulated to prevent the operation of automatic block signals, the only provision for protecting their movement was spacing enforced by burning fusees. However, the operating rules on the road involved do not specifically provide for the dropping of lighted fusees at intervals when the movement is proceeding at less than normal speed in territory where the view is obstructed. The chief examiner of the Commission said, however, that they implied that, when conditions require, fusees should be dropped at intervals by the crew of a track motor car.

The investigation also brought out that the operator of the motor car had been examined on the rules about nine years prior to the accident, but since he was killed, it could not be determined what understanding he had of the rules, nor why he failed to provide the necessary protection.

On the basis of its investigation, the Commission found that this accident was caused by failure to provide adequate protection for the movement of the motor car involved.

Cleaning Six Miles



Of Sewer Pipe

When the extensive sewerage system serving the Clearing yard of the Belt Railway of Chicago became badly clogged with sand, silt and other foreign matter, it was cleaned with a high degree of success, using modern mechanized methods of doing such work. Altogether, about 15,000 lin. ft. of main sewer pipe and 16,000 ft. of laterals were cleaned. This article describes the methods used and discusses other interesting aspects of the work.

AN EXAMPLE of the application of modern pipe-cleaning methods to railroad work is afforded by a recent large-scale project carried out on the Belt Railway of Chicago, in which about 15,000 lin. ft. of a main sewer and 16,000 ft. of branch sewer lines were cleaned, removing a large quantity of sand, silt and other matter from the pipes. Some conception of the conditions encountered, and of the total amount of material removed from the sewer lines, is gained from the figures relative to one 350-ft. section of main sewer having a diameter of 33 in., from which a total of 1,100 cu. ft. of matter was removed; an amount equivalent to 53 per cent of the capacity of the pipe.

Extent of System

The sewerage system involved in this project is located at the company's large Clearing yard at Chicago, where it handles all sanitary and storm sewage from the vicinity of the yard, including waste water from the engine terminal and wet ash pit, as well as a certain amount of industrial waste. That part of the main line of the sewerage system for which the Belt is responsible is approximately 15,000 ft. long and ranges in diameter from 12 in. to 84 in. In addition, there are several miles of lateral sewer lines ranging in diameter from 8 in. to 18 in., including one 12 in. in diameter and 700 ft. long extending to the wet ash pit at the engine terminal. The smaller sizes of pipe in the laterals and the main sewer consist of tile, while the larger sizes in the main are of brick or concrete construction.

During recent years it had become apparent that the efficiency of the sewerage system at Clearing had become seriously affected by the accumulation of material in the various lines. In the main sewer this consisted largely of deposits of sand, cinders and silt, which had accumulated to such an extent as to reduce seriously the flow capacity of the line. In some of the laterals the trouble was due largely to deposits of incrusting material which, in the case of the line leading to the cinder pit, had accumulated to the point where the pipe was completely clogged.

Since it was apparent that the

Showing Enclosure Protecting the Rig at a Manhole, and Pile of Material Removed

sewerage system was badly in need of cleaning, it was decided to take advantage of the effective mechanized methods that are now available for doing this kind of work. The first step in this direction was made in 1939 when a section of the main sewer line about 2,300 ft. long was cleaned. Subsequently, additional cleaning work was found necessary, as a result of which the entire length of the main sewer for which the railroad is responsible was cleaned. In addition, as already indicated, a total of about 16,000 ft. of lateral sewer lines were cleaned.

Method Used

The method used to clean the main line of the sewerage system involved the use of a special sewer-cleaning bucket which is drawn through the pipe by means of a cable winding on the drum of a power-driven winch.

The Bucket-Pulling Rig in Operation. Note Amount of Material that Has Been Removed from Sewer at This One Location

This method entails the cleaning of the pipe in sections between consecutive manholes, the work of cleaning one section being completed before proceeding to the next section. In the main sewer line at Clearing yard the manholes are generally spaced 330 ft. apart. In several instances, however, where manholes had been covered by embankments, it was necessary to clean sections 660 ft. long. In another instance a section 450 ft. long was cleaned. Contributing somewhat to the difficulty of doing the work was the fact that some of the manholes were 25 ft. in depth.

In preparation for cleaning a particular section of sewer line, a rig for pulling the sewer bucket was set up over the manhole at each end of the section. Each of these rigs embodied a frame of structural angles for mounting the bucket-pulling mechanism, which included a single-cylinder 7½-hp. gasoline engine for operating a drum on which the pulling cable was wound. The power transmission consisted of a silent chain drive and a friction clutch. From the drum the cable extended over a sheave at the top of the frame, and then down into the manhole and around another sheave near the bottom, which was braced between the walls of the manhole. The sheave in the manhole was of a shape to handle the particular size of sewer bucket being used and had a groove in the middle to receive the cable.

With the rigs in place over the two manholes, the next step was to project the pulling cable through the sewer between them. This was usually done with the aid of sewer rods consisting of lengths of wood about 3 ft. 7 in. long, provided with metal fastenings at the ends, by means of which they could be attached together. A string of these rods was inserted into the sewer pipe from the manhole at the upstream end of the section to be cleaned, additional rods being added until the string had penetrated to the next manhole. If no obstructions were encountered in the pipe the sewer rods were floated the length of the section; otherwise it was necessary to apply considerable pressure to force the rods through obstructing material. To permit this, the couplings between the rods used were designed to afford relatively rigid connections.

When the rods had been forced through the section of pipe to be cleaned, a rope line was attached and pulled through. Generally speaking, the rope was then used to pull a ¼-in. cable through the section, which, in turn, was used to pull a ½-in. cable through, the latter cable being used subsequently for pulling the sewer bucket through the pipe. The method of threading the pulling line through the sewer may be varied considerably according to the conditions encountered.

Buckets Described

The sewer buckets used in the cleaning work consisted of sections of steel pipe about 20 in. long and ranged in diameter, in 2-in. increments, from 4 in. to 16 in., the size used depending on the diameter of the pipe to be cleaned. The buckets were reinforced by means of steel rods welded to them longitudinally on the outside. Each bucket was open at one end and had a two-piece maw at the other end, which was opened and closed by the pull of the cables on bails provided at each end of the bucket. When the pull was exerted on the bail at the maw end of the bucket, the jaws of the maw were held in the open position; when the pull was exerted on the cable at the opposite end, the maw was brought to the closed position.

To place the sewer bucket in position for the cleaning operation the

(Continued on page 173)

The Future Challenges

The Track Man

By A. G. REESE
District Engineer Maintenance of Way
Chicago, Burlington & Quincy
Galesburg, Ill.

This article comprises an address that was presented as part of a symposium before the December, 1945, meeting of the Maintenance of Way Club of Chicago, which was a sequel to the November meeting when C. H. Mottier, vice-president and chief engineer, Illinois Central, discussed the question: What Is Ahead for the Maintenance Forces?* The subject of the symposium was: What Are We going To Do About It? In his address Mr. Reese endeavored to answer this question from the viewpoint of the track man.

IT HAS been pointed out that one of the major problems facing track men is that of building up and maintaining their tracks to the high standards that will be required by future conditions. This is not the first time that maintenance men have been confronted with a problem of this nature. The operating and traffic departments of the railroads, in their constant struggle to improve service and to get and hold business, have not always conferred with the track man in advance to determine whether his part of the railroad is capable of handling the new equipment contemplated at the increased speeds desired. Usually the track man is instructed or ordered to be prepared at a particular moment to accept the new equipment and schedules, and too often it happens that this time is very short.

Problem Encountered Before

During the period following World War I, conditions similar to the present were encountered and overcome. Generally, the track structure at that time was much inferior to the average that prevails today. Ties were largely untreated and poorly seasoned. Rail was much lighter and a large part of it was badly worn and battered from the heavy traffic that was carried during the war. Ballast was not up to the standard of that in many of our present secondary branch lines. However, advantage was taken of the increasing supply of steel products, treated ties and improved practices, with the result that the track structure was improved and strengthened as necessary to permit the increased loads and speeds to be handled without delay.

We are now entering an era in which all our resources will be needed to cope with the rapid changes in conditions that are likely to occur. How these changes may affect the ordinary processes of life is problematical, but we, on the railroad, are certain to be faced with demands for increased speeds and better service generally. We realize clearly that speeds, high as they may be at present, will have to be increased still further in the future, when competition by air and on the highways will be a constant threat to railway business. While the direct con-

Other Departments Have Not Always Conferred with the Track Man in Advance Regarding Contemplated Improvements in Service

*An abstract of Mr. Mottier's address was published in the January issue, page 60.

tact with the public in connection with the demand for higher speeds and better service rests mainly with the traffic and operating departments of the railroads, the track department has a most important part to play in satisfying the demand. The luxurious trains now in service and the more luxurious ones to come might as well be made of cardboard and placed on exhibition in some museum, if an adequate track structure for carrying them is not provided.

In the present situation the track man faces the future with a roadbed and track structure that have already been greatly improved. During the last few years many fills and cuts have been graded, both to provide better drainage and to obtain a more stable sub-grade. Curve reduction and grade revision have been prosecuted vigorously. Enormous strides have been made in improving crossties, with the result that today 90 per cent of all renewals are made with ties that have been scientifically selected, seasoned and treated. For instance, in 1943, a total of 45,439,512 ties were inserted in renewals on the railroads of this country, of which 41,530,190 were treated. Since the practice of treating crossties has been followed generally for some years it is reasonable to assume that the tie condition on the American railroads as a whole is somewhat better than at any time in the past.

Heavier Rail

For many years a gradual increase has taken place in the average weight per yard of all rail rolled for insertion in the tracks of the railroads of this country. In 1944, 80 per cent of the entire rolling consisted of rails weighing 100 lb. per yd. or more, whereas in 1927 the percentage was 76. With this heavier rail being laid in the heavy traffic lines, and with the rail released being, in turn, re-laid in secondary lines, the result has been a material improvement in the rail condition as a whole.

There has also been an improvement in the ballast section. Much of the ballast formerly used proved to be inadequate under the severe operating conditions that developed as a result of the introduction of heavy equipment operating at high speeds, with the result that it became necessary in many instances to replace the older types of ballast with better material. Consequently, many miles of track have been surfaced and ballasted with crushed slag and rock. There is no question but what the ballast condition on the railroads generally has been greatly improved in recent years, and it is expected that this improvement, along with the use of better ties and heavier rail, will be reflected in reduced costs of maintenance in the future.

However, there is evidence to indicate that the shortage of ties and rail that prevailed during the war years may continue for some time yet. As a consequence, track men will have to anticipate their needs for these items and be prepared to handle the available supplies for insertion where they are most needed. With regard to rail, local officers will not always know how much to expect; for this reason they will have to be alert to the needs of their territories so that they will be in a position to accept increased or reduced deliveries and to make necessary adjustments in their rail-laying programs.

Labor Outlook Poor

Assuming that the track man has a good foundation in his present track structure, and that materials will be available for constructive work programs, how is he going to maintain the present standards, and, in addition, make the improvements that will be demanded by conditions? Labor forecasts are not optimistic, and new sources of track labor have not as yet been developed. The wage scales of competitors in the labor market have made it difficult, if not impossible, during the last several years to maintain an adequate track force, and it is questionable whether there will be much improvement in the immediate future. Some service men have returned to their former positions in the track department, and undoubtedly others will return when they have been discharged, but this source will supply but a minute part of the demand.

Many Mexican Nationals, reaching a peak of approximately 68,000, have been employed on the American railroads during the last several years, and much constructive maintenance of way work has been done with their help. However, shortly after the end of the war a ruling was issued requiring that all these men be returned to Mexico within a relatively short time. High school students have been used to a considerable extent by maintenance departments, and much work has been accomplished with their help. Undoubtedly, many railroads will continue to take advantage of this source of labor. The wholesale closure of war plants has resulted in the return of many workers to small towns, and probably many of these men will be available to the railroads. In taking full advantage of opportunities of this sort, much depends upon the roadmaster and the foreman, and their diligence in endeavoring to locate available men. However, since it is questionable whether the necessary quantity of labor can be obtained from these sources, maintenance men may find themselves faced with a labor shortage for some time to come.

Greater Mechanization

Assuming that labor will remain scarce for the time being, it will be necessary to depend to an increasing degree on mechanical equipment as a means of getting necessary maintenance work done. Remarkable progress has been made in the development of power tools for doing railroad maintenance of way work, and further developments can be expected. Mechanical jacks, tie tampers, discers, cribbing machines, ballast cleaners, and many other power tools designed to permit maintenance work to be done with increased efficiency, have been perfected and their use is now the rule rather than the exception. Since the railroads and the manufacturers are alive to existing conditions, and their research departments are busily engaged in the design and development of other mechanical aids, it is certain that additional appliances will be made available. Because of the trend toward the greater use of equipment, radical changes in present practices are indicated, requiring, possibly, that work be centralized and confined to a limited section in order to exact the full possibilities of the equipment and men that will be available.

However, it is obvious that the mechanical equipment used in maintenance work is not in the form of robots that perform the will of their masters from a distant station. Having no mind, they function only under the hand and direction of a track man. Therefore, regardless of the number and efficiency of the machines in use, it will still be necessary to lean heavily on manual labor as a means of getting work done. While the labor outlook is decidedly gloomy and discouraging at present, we do have a nucleus around which to build a competent and efficient track force. There are many experienced foremen and laborers working for the railroads who have repeatedly demonstrated their ability and loyalty, and we would be remiss in our obligation to these employees if we did not continue our confidence in them.

The present chaotic labor situation will undoubtedly be settled in the not too distant future. This is true because the average American citizen is a rational being and, while he may stray momentarily, he cannot forget entirely the fundamentals on which the standards of this country are built.

Maintaining Water Service Facilities—

Tanks

Part I

By C. R. KNOWLES
Superintendent Water Service (Retired), Illinois Central, Chicago

No. 16 of a Series

This is the first installment of a two-part article dealing with the maintenance of water tanks. In this part the author first emphasizes the importance of proper inspection of tanks, and then discusses separately the various parts of both wood and steel tanks and gives pointers to be observed in maintaining them. Part II, to be published in the April issue, will deal with the moving of tanks, frost and fire protection, and the painting and cleaning of tanks.

Wood Tank with Flat Hoops and Welded Steel Tank with Ellipsoidal Bottom

THE WATER tank is one of the most important facilities on a railroad, and is perhaps the most neglected. So long as the tank does not show visible signs of collapse or leak excessively, it is usually assumed to be in good condition; yet too often unseen rust and decay are making inroads that shorten its life, requiring that heavy repairs be made at most inconvenient times. Its period of usefulness can be extended materially and the overall cost of maintenance reduced by periodic inspections and the making of minor repairs as needed.

Of the more than 25,000 water tanks on American railroads, 18,000 are of wood, 7,000 are of steel and less than 100 are of concrete. In addition to the water tanks, there are about 1,350 steel tanks at fuel-oil stations, most of which are under the jurisdiction of the water department.

Copyright, 1946, Simmons-Boardman Publishing Corporation.

First Requisite—Inspection

The first requisite of proper tank maintenance is thorough, systematic inspection at regular intervals of not more than one year, followed by prompt repairs where defects are found. A record of tank inspections should be kept on a form provided for that purpose. This form should list in detail the principal parts of the tank and tower, and should provide space for showing the condition and the estimated cost of repairs. If desired, separate forms may be provided for steel and wood tanks; as a rule, however, one form will answer for both.

The maintenance of wood tanks differs materially from that of steel tanks. With the latter the problem is largely one of keeping the tank well painted. Untreated timber structures being subject to decay, necessitate routine maintenance to keep them in serviceable condition, while treated timber tanks require little maintenance other than the hoops and tank fixtures. Concrete tanks that are properly designed and constructed require no maintenance.

Foundations

Good tank construction demands masonry foundations, and repairs to such foundations are rarely necessary. Such defects as the sloughing off of concrete or the disintegration of brick or stone piers should be repaired promptly.

If the foundation is constructed of untreated timber sills or stringers, they should be checked carefully for indications of decay. Particular attention should be given to the timber forming the piers. Blocks and sills may be replaced without taking the tank out of service by clamping timbers on the posts and raising the posts

with jacks to permit inserting new timbers. Foundations should be checked for settlement, and repairs made promptly. Scour from rainfall or waste water should be repaired by filling the scoured places, preferably with earth and stone.

Timber Towers

The timber tower or frame of the wood tank, including the posts, bracing, caps and floor joists, requires careful inspection and maintenance. The bottom ends of the posts should be examined for crushing and brooming, as there is a tendency for decay to start at these points because of the presence of moisture. Signs of decay can be detected by tapping the posts with a hammer or bar.

Posts can be repaired or renewed without taking the tank out of service. In many cases they can be repaired by cutting off the defective portions and putting in splices or butt posts, although in some instances it may be necessary to renew the posts in their entirety. In renewing posts, vertical timbers may be placed under the caps, and jacks used to lift the caps and tub to permit the post or its butt end to be replaced. Only one post should be removed at a time. The new post or butt end should be placed in a fixed position, and braces and bolts applied before beginning the work of removing another post. The center posts may be raised with one jack while the outside or corner posts will require the use of two jacks. It is advisable, however, to use two jacks in all cases if possible, providing the second one does not interfere with the work of placing the post in position, as this procedure results in a better distribution of the load and less strain on the tub.

For temporary repairs, a false or helper post can be wedged alongside the weak post to carry the load until permanent repairs can be made. When splicing posts, a bolted dap splice should be used, as this form is stronger, neater in appearance and less susceptible to decay than a butt splice. The length of the splice should be twice the thickness of the post. Three bolts should be sufficient to hold the splice in place. The abutting ends of all splices should be well swabbed with creosote.

Caps and Joists

Caps and floor joists should be examined for indications of crushing. Decay will usually occur at the ends or at other places where these members rest upon other timbers. Decay not visible on the surface may be detected by sounding with a hammer. The tub may be raised to permit the repair of caps and joists in the same manner as for the posts, by placing timbers under the tank bottom and using jacks. It is rarely advisable to splice caps or joists; as a rule the entire joist or cap should be renewed. Care must be exercised in jacking up the tank to avoid distorting the tub or frame. If lifts of more than three inches are required, the entire tub should be raised. It is advisable to lower the level of the water in the tank before raising it.

Braces should be examined carefully and all defective pieces renewed. If loose, fastenings holding plank braces in place should be secured by renailing or by tightening bolts. Where X-braces are used, the rods should be kept pulled up to insure that the braces are held rigidly in their proper position.

Steel Towers

Steel towers for both steel and wooden tanks should be inspected closely for loose rivets and bolts. The base plates and bottoms of the tower posts, and the inside surfaces of box columns at the base, should be checked for corrosion. Dirt and trash should not be allowed to collect at these points. If water accumulates within the column, the space should be filled with cement grout. If there is a tendency for water to accumulate between the base plate and the foundation, this space should be filled.

When badly corroded, towers should be reinforced by welding or by the addition of plates. The bottom ends of posts are sometimes jacketed with concrete to arrest corrosion. Towers and frames should be checked carefully for any indication of twisting or misalinement due to uneven settlement of the foundation or failure of the bracing rivets and bolts. Tanks on high towers and on buildings, used

Rivetted Steel Tank with Conical Bottom. A Total of About 7,000 Steel Tanks Are in Service on American Railroads

Creosoted Wood Tower and Tank With Round Hoops. There Are 18,000 Wood Tanks in Service

for fire protection, must be maintained in accordance with the rules of the fire underwriters, both as to the tank and the tower.

Staves and Bottom

As a rule the tub of a wood tank will require little maintenance if constructed of durable or treated timber. Certain precautions should be followed, however, to avoid premature decay. No leaks should be permitted in staves or bottom planks. If the tank has been constructed properly, no leakage will occur at the joints. Where creosoted timber is used, there may be seepage through the staves and bottom planks, or there may be decay in old planks that will permit the water to seep through the wood. This condition may be corrected by the application of sealing compounds similar to those used on roofs and in boiler settings. Bad leaks may be repaired in many instances by calking the worst leaks and applying the sealing compound to the interior of the tank. The success of repairs of this kind depends largely upon the methods followed in applying the compound. One railroad has developed a method of applying this sealing material, which has proved successful for the last ten years. This method of application is as follows:

(1) The surface of the wood should be clean. The surface should be wet before the compound is applied to permit a good bond between the compound and the wood.

(2) Small cracks should be filled with the sealing compound before applying it to the surface of the wood. Cracks or openings wider than ⅛ in. should be calked with oakum before applying the compound.

(3) After all cracks have been filled, the surface of the wood should be moistened and a coating of the compound spread evenly over the surface to a thickness of ⅛ in.

(4) The sealing compound should be allowed to set for 48 hrs. before the tank is filled with water.

The best method of repairing a badly-decayed and leaking tank bottom is to construct a false bottom of plank of approximately the same thickness as the original bottom, calk all open cracks or seams with oakum and finish with a coating of sealing compound or asphaltum. Badly decayed staves may be repaired by bolting patches over the defective staves in such a manner that they will stop any leakage and also furnish support for the defective staves. Nails should not be used as they will not have sufficient holding power.

Decay at the tops of staves is very rapid where tanks are not kept filled with water. This is particularly true of tanks without roofs. To avoid excessive decay of the staves, the tank should be kept full of water, especially during the summer months and daylight hours, when the rate of evaporation is the highest, as it is the alternate wet and dry condition that promotes the decay.

Hoops

Tank failures are almost always due to defective hoops; therefore, too much emphasis cannot be placed upon the importance of keeping them in safe condition at all times. Flat hoops will rust from the inside where they are in contact with the staves. As a rule the most severe corrosion is found at or near the lug. It is impossible to determine the true condition of flat hoops from observation, as they may be rusted nearly through the metal before there is any indication of corrosion on the outer surface. Although their condition may sometimes be determined by the use of a sharp-pointed inspector's hammer or punch, the only sure method is to remove the hoops for a thorough examination. The condition of round and half-round hoops can be determined readily without the use of tools, as practically all of the hoop is visible.

Since the corrosion of round and half-round hoops with threaded ends will proceed most rapidly within the lugs, it is good practice to fill the threads inside the lugs of all hoops with a heavy grease or anti-rust compound. It is poor practice to replace only part of a set of hoops, except as a temporary expedient.

In the event of the failure of one or more hoops, the level of the water in the tank should be lowered immediately to reduce the pressure, and the remaining hoops should be examined immediately, for the failure of one hoop may be an indication that the other hoops are unsafe.

In placing hoops around a new or old water tank, the following procedure should be observed:

Hoops of standard tanks are usually in three sections of practically uniform length. The lugs should be applied to both ends of all sections of flat or half-round hoops, and to one

end of each section of round hoops. In applying the hoops two sections should be pulled up in place around the tank and held in place by 2-in. by 4-in. wood cleats spaced not more than 5 ft. apart. Where hoops are applied to old tanks, sound staves should be selected on which to place the cleats; if they show decay, more cleats should be used.

When the first two sections are placed in position around the tank, the third section should be raised to position and secured in the same manner as the first two sections; one end should be bolted to the adjacent section and the loose end then pulled to position and bolted to the other end. No attempt should be made to apply hoops to tanks without a sufficient number of men to insure safe handling, and each man should be instructed as to his part in handling the hoops.

Ladders

The condition of the ladders on tanks is important from the standpoint of safety. These ladders should be maintained in good condition at all times. Where nails are used to fasten the rungs to the side members, they should be inspected very carefully to see that the nails are not rusted off underneath the rungs. For added safety and durability, the rungs should be dapped into the side members or supports of the ladder. Steel ladders should be examined closely for possible weakness through corrosion, particularly at points where they are fastened to the tank or tower. Revolving ladders on steel tanks should receive careful attention, especially the connection at the finial. Inside ladders are subject to greater corrosion than outside ladders. A hinged door about 6 ft. long and fitted with a hasp and staple may be placed over the lower portion of the outside ladder to keep children and other unauthorized persons off the ladder and tank. This door should be kept locked except when the ladder is being used by employees.

Tank Roofs

The primary purpose of a roof on a water tank is to protect the water from pollution. Many state laws require that tanks must be roofed if the water is used for human consumption. A roof is also a protection against frost in cold climates and, if properly maintained, keeps birds and rodents out of the tank. It is also a protection to the tops of the staves, and adds to the appearance of the structure.

If the roof is to serve its purpose it must be maintained in good condition at all times, as a poor roof is worse than none at all. If a roof cannot be maintained in good condition it should be removed. In cold climates, the space between the staves and roof should be sealed as a measure of frost protection. Ventilation should be provided at the pinnacle of the roof. In warm climates, wire mesh screen may be placed above the staves to furnish ventilation and to keep out birds and animals.

In making repairs to roof supports, care should be exercised to prevent the roof from exerting any outward pressure on the staves. Rafters and sheathing should be kept in good repair to eliminate the possibility of workmen falling through and to prevent pieces of wood from dropping into the water or blowing from the top of the tank and creating a safety hazard. Hatches and hatch covers should be properly maintained and should be constructed of comparatively light material so they can be handled by one man. They should be secured in such manner as to avoid the danger of their falling or being blown from the roof.

Steel Tanks

The interiors of steel oil and water tanks should be inspected annually, the same as wooden tanks, although if this cannot be done conveniently, the internal inspections may be made at intervals up to two or three years if there is reasonable assurance that the character of the water or other contents will not cause rapid deterioration.

The roofs of steel tanks and the upper rings of the shells should receive special attention for it is at these points that corrosion will be most severe. This is so because of condensation on the inside of the roof, and because the upper part of the tank shell is subjected to a wet and dry condition due to fluctuating water levels. The spider rods across the top of the tank shell are of use in the construction of the tank but add nothing to its later strength or durability; these rods may rust out quickly, but it is unnecessary to renew them as they serve no useful purpose after the tank is erected. The bottom sheets of flat-bottom tanks should be examined closely as corrosion is likely to occur in them because of the precipitation of corrosive agents. This corrosion is often concealed by sediment and for this reason it is advisable to clean and wash the tank bottom before making the inspection.

Leaks in steel tanks occur in calked joints, at rivets or where pits due to corrosion have eaten their way through the sheets. These pits are most likely to occur at the bottom of the tank or in the riser pipe or mud drum of conical-bottom tanks. These leaks usually signify that the sheets are becoming thin and are the forerunners of other leaks. The sheets should be thoroughly examined on the first indication of a leak of this kind. A patch bolt or spot welding will serve for temporary repairs, although the heating of the sheet in welding sometimes causes additional leaks to occur. The only permanent method of repairing such defects is to replace the sheets affected.

Tank Fixtures

The proper maintenance of tank fixtures is essential to the uninterrupted delivery of water to locomotives. These fixtures include the tank valve and spout, together with their operating mechanism, the water-level indicator, the automatic valves for controlling the water level in the tank, and the float switches used in the control of automatic pumps and the operation of signal alarms.

Perhaps the most important among the fixtures, from an operating standpoint, are the tank valve and spout. The normal wear and tear on tank valves is slight, but they are often damaged by pieces of wood, sticks, birds, fish and other objects lodging under them, resulting in damage to the valve and the leather or rubber valve seat. This type of damage can be avoided to a large extent by preventing such debris from entering the tank.

Valve rods, levers and other connections should be kept in good condition. Fulcrum pins are sometimes allowed to wear to the extent that they become loose. This permits lost motion, throws the valve lift out of adjustment and may cause the valve to chatter, with resultant damage to the valve seat. The valve lever counterweight should be adjusted properly to close the valve and prevent chattering. The correct adjustment of the valve lift is also important; the lift should be sufficient to secure the maximum delivery of water, but should not permit a rate of delivery that makes it difficult to hold the spout in the manhole of the tender.

The spout should be so adjusted that it will provide ample clearance for cars and locomotives when not in use, and at the same time permit taking water without waste or possible injury to firemen on tenders with varying heights above the rail. Counterweights should be properly adjusted to balance the weight of the spout to assure ease in handling and to hold it

in an upright position with the required clearance when not in use. The sheaves carrying the spout and counterbalance weights should be well oiled to permit them to move easily and to avoid excessive wear.

Valve and spout ropes should be given careful attention. The loose ends of ropes should be wrapped with strong twine to prevent their fraying. Frayed weak ropes should be renewed as required; they should be fastened securely to the spout and valve lever. Knots should not be permitted in the ends of ropes as they may injure trainmen. Proper maintenance of tank spouts, sheaves, chains and ropes results in greater ease in handling, and has a tendency to decrease the damage to the spouts from rough handling by firemen when taking water. An extra spout should be kept in reserve at each tank where spouts are used to avoid delay in the event that a tank spout is damaged beyond use. Maintaining extra spouts at a central point on a division is not always satisfactory because of the time required to get them to the points needed; furthermore, the lengths of the spouts may vary with different tanks.

Indicator boards showing the height of the water in tanks should be graduated in feet, with the halves and quarters indicated, using plainly distinguishable figures at the foot marks. The indicator target should be held in place on the board by grooved strips on each side and should move freely. For convenience in reading at night, the indicator board may be placed near the ground instead of on the side of the tank.

Where float valves are used, they should be adjusted and maintained carefully in order to control the level of the water in the tank to avoid overflow and at the same time permit filling the tank to within a few inches of the top. This is particularly important with wood tanks as it is desirable that such tanks be filled to the top to prevent the upper ends of the staves from drying out. These valves should be inspected frequently and cleaned at regular intervals, for deposits will form rapidly within certain valves, particularly if the water is treated.

Float Valves

Floats should be examined for possible corrosion or leaks that may cause them to become waterlogged and inoperative. It is good practice to fasten the float to the roof timbers with a loose chain to permit it to be lifted from the water readily if it should become waterlogged. The lifting chain should have sufficient slack to permit the float to operate the valve lever freely.

Cleaning Sewer Pipe

(Continued from page 166)

bail at the open end was attached to the pulling cable at the rig over the downstream manhole, and the bail at the maw end was attached to the cable extending through the sewer pipe to the winch at the upstream manhole. To clean the pipe, the bucket was pulled down into the manhole, over the sheave at its bottom and into the pipe. When, in the judgment of the operator, the bucket had been filled, the direction of pull was reversed and the bucket, with the maw now closed, was drawn back out of the pipe and dumped. This procedure was repeated until the section of pipe had been thoroughly cleaned of all foreign matter.

When the work of cleaning a particular section of pipe had been completed, the rig over the upstream manhole was moved forward to the downstream manhole of the next section and the cleaning procedure was repeated for that section. The reason for carrying the cleaning work progressively downstream was to avoid the possibility of the cleaned section becoming filled in again by material loosened during the cleaning work and carried along by the flow in the pipe, which would have been the case if the progress of the work was upstream.

Electric Cleaner Also Used

Wherever possible the method described was also used for cleaning the laterals. In some instances, however, because of traffic conditions or the locations of the manholes, it was not readily possible to use this method. Also, in the case of the 700-ft. lateral to the wet ash pit, which, as already indicated, was completely clogged with incrusting material, it was apparent that some other method would have to be used, at least initially until an opening had been established through the line. In all these instances the pipes were cleaned with the aid of an electrically-driven rotary pipe cleaner, a type which involves the use of rotating cutting tools of various types fastened to the end of a flexible, open-wound cable operated by a motor placed on the surface. Where electric power is not available, this equipment can be operated by a gasoline engine or by compressed air.

With this equipment the foreign material in the line was loosened so that it could be flushed into the catch basins for removal. In the case of the lateral sewer to the wet cinder pit, the line was opened with the aid of the electric sewer cleaner, after which the job was finished by the bucket-and-winch method.

To a large extent the work of cleaning the sewerage system was done without interfering with traffic, although in a number of instances, where the bucket-and-winch method was used, it was necessary to take a yard track out of service temporarily while the work was under way. When using this system it was important that the operators of the two winches be in constant communication with each other to permit the necessary signals to be transmitted for the operation of the winches. Where visibility was unobstructed, such signals were readily transmitted by hand, but where there were obstructions to a clear view between the two set-ups, other means had to be devised for giving signals, including jerk cords and flags, depending on the conditions encountered.

Incidental Developments

As the sewer-cleaning work progressed there were a number of incidental developments worthy of mention. It was discovered, for instance, that objectionable industrial wastes were being drained into the system, with the result that the necessary steps were taken to remedy this situation. Also, at a number of locations, existing defective conditions of the sewer lines and manholes were brought to light. Where possible, such defects were repaired immediately with company forces, although, due to the labor shortage, it was necessary to defer the work at other points until conditions should become more favorable. Another incidental feature of the work involved the locating of manholes that had been covered over, and extending them to the surface to permit their use in the cleaning work.

Experiences gained during the work described in this article indicated that, when undertaking the cleaning of a sewer line, the best practice is to clean the entire line, rather than only a part of it. The reason for this is that, where only a section of a line is cleaned, a pocket is formed in which new sediment accumulates rapidly.

The sewer-cleaning project described in this article was carried out under the general direction of A. B. Hillman, engineer maintenance of way, Belt Railway of Chicago, and under the direct supervision of H. C. Koch, roadmaster. The work was done under contract by the Pittsburgh Pipe Cleaner Company of Illinois, Chicago, using equipment specially developed for this class of work.

What's the ANSWER?

How Long a Guard Rail?

What is the shortest length of guard rail that is satisfactory under high-speed trains? Is there any difference for facing-point and trailing-point turnouts? For frogs of different angles? For curve or tangent? Why?

Opinions Differ

By H. R. CLARKE
Chief Engineer, Chicago, Burlington & Quincy, Chicago

The most suitable length of guard rail for present train speeds and to meet the various conditions that arise is a question about which there is some difference of opinion. Only a few years ago, 15-ft. guard rails were in use with turnouts of practically all angles. As these seemed to be longer than necessary, resulting in waste of material, the use of a shorter guard rail became quite general, a common length being 8 ft. 3 in., determined probably by the fact that four guard rails could be cut from a 33-ft. rail.

As speeds increased some objection to this guard rail arose, the principal one being that the flare was too short and abrupt and a somewhat longer guard rail was adopted—usually about 9 ft.—the purpose being to lengthen the flare and provide an easier entrance to the flangeway.

Practice on the Burlington followed substantially this course and, until we began to use 131-lb. rail, the 9-ft. guard rail was our standard length. We adopted the 12-ft. guard rail with the 131-lb. rail. However, these lengths were found to be unsatisfactory with present high speeds and we are now using a 13-ft. guard rail for No. 9 and No. 11 turnouts; and a 15-ft. guard for turnouts of No. 15 and 20, this now being our standard regardless of the weight of the rail. However, these lengths will be used principally with the 112 and 129-lb. T. R. section for the present.

Since we cannot be sure that any given turnout will always be trailing point, the question as to the difference, if any, for facing and trailing points is more or less academic. As we operate on the Burlington, traffic is reversed so frequently in multiple-track territory that, in effect, all switches become facing-point switches and should, therefore, be treated alike.

As indicated in the foregoing, a shorter guard rail may be used with frogs of larger angle, compared with the longer turnouts. Generally, curve and tangent should be treated alike, except that in extreme cases a special guard rail designed for the installation may be required. It should be pointed out that if at all possible to avoid doing so, switches should not be installed on curves on high-speed tracks.

Suggests 16½-Ft. Minimum

By W. H. SPARKS
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

Sixty years ago, before the Roadmasters' Association had acquired enough influence to affect maintenance practices, and more than a decade before the American Railway Engineering Association was organized, all guard rails were the same length as the frogs with which they were used. No difference was made between facing and trailing points. The guard rails of the period were merely spiked in place, no other form of fastening being in use. There were no filler blocks to act as a guide for the width of the flangeways, many of which were entirely too wide. While foot blocks in the flare of the flangeway were beginning to be used, they were not universal.

Rail sections were light, few roads

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in April

1. *How often should track be surfaced out of face? What are the indications that such surfacing is needed?*
2. *What precautions should be taken to insure that men using power machines and power tools are protected against personal injury?*
3. *Where track in cuts or on light fills is unstable because of high ground-water table, what methods can be employed to overcome the trouble? Which is the most effective? Why?*
4. *What characteristics are demanded for timbers that are to be used for stringers in trestles? What woods most nearly meet this requirement?*
5. *How many anti-creepers should be applied to a panel? Why? What effect, if any, do they have on the life of the rail?*
6. *What is a synchronous motor? For what service is it adapted? What are its advantages for pumping water? Its disadvantages? To what extent are they used in railway pumping?*
7. *How does one insure that the fuel for two-cycle engines on track motor cars contains the correct amount and grade of lubricating oil? Should the mixing be done at the tool house or at the storehouse? Why?*
8. *Is it good practice to lay a brick floor in shops or enginehouse without a concrete base? Why? How thick should the base be?*

having rail in their main tracks as heavy as 75 lb., although it was only a few years until 100-lb. rail became standard on two roads. Speeds were low, compared with today, and both cars and locomotives were much lighter than current designs. The same guard rails were used on main tracks and yard tracks.

These guard rails fulfilled all requirements of the period and served satisfactorily until rail sections began to increase in height. This brought a gradual development of the guard rail, and particularly of its fastenings to provide higher resistance to the impact of the wheels. This development included filler blocks bolted through both the running rail and the guard rail. A single filler block was placed opposite the frog at first; then one at each end and, on some roads, at all three points. Finally, because the rails were getting higher and the filler bolts gave considerable trouble from breakage, the guard rail clamp came into use to prevent the rail from turning over, and this device passed through a comparable period of development.

With the rigid fastening which the present designs of guard-rail provide, I am firmly convinced that what we need most is a guard rail of sufficient length to straighten out car and locomotive trucks and drivers before they reach the point of the frog, and to do this without too much impact and to keep them lined up and away from the point until it has been passed. On all main tracks, this length should be not less than 16½ ft.

Tipping Rails on Curves

Under what conditions do rails tend to tip over on curves? What can be done to prevent it? Is the outer or inner rail more affected? Why?

Under Horizontal Thrust

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Rails tend to tip over when horizontal thrust acts on the head of the rail. This horizontal thrust is the component of all of the forces acting on the head of the rail simultaneously, and its magnitude is determined by the magnitude of the several forces acting in concert. These forces consist of gravity, centrifugal force, the force required to change the direction of car trucks and locomotive drivers, a wedging action in the plane across the tops of the rails if the curvature is too sharp for the wheel base, and another in this same plane caused by the difference of wheel travel on the outer and inner rails of the curve.

Superelevation on curves allows gravity to balance the outward thrust caused by change in direction, figured for the rate of change in direction on the particular curve elevated, but the figures assume a fixed height for the center of gravity for all moving equipment and for a given speed. Any wedging thrust or any thrust caused by fixed axles canot be balanced by superelevation. These latter thrusts are equal on both rails.

If the speed is too great for the elevation that has been provided, there will be an added thrust on the outer rail, combined with the other thrusts, and if the speed is too low for the elevation, the unbalanced part of the force of gravity will be added to those acting on the low rail.

Because all assumptions will be approximations with respect to speed, centers of gravity, precise elevations and curvatures, it is evident that the track structure must be strong enough to withstand all thrusts to which it will be subjected under reasonable use. At high speeds the outer rail must be kept secure in every reasonable way. Under low speeds the inner rail will take the greater stress and thus will be more affected. These stresses may be of sufficient magnitude to cause the metal to flow on the head of the inner rail, causing it to trough, corrugate and otherwise aggravate the conditions causing the stresses.

A Complicated Subject

By Supervisor of Track

The action of car wheels on curves is somewhat complicated and requires serious study of the forces involved before one can arrive at reasonable conclusions. Generally speaking, however, there is little tendency for the outer rail to overturn until the speed of trains exceeds the speed for which the curve was elevated. On the other hand, the inner rail is subjected to overturning forces at practically all speeds, except in the rare case where the speed approaches that at which the wheels tend to or actually raise the wheels from this rail and relieve it of its share of the distributed weight of the equipment.

Perhaps the reason for these forces and the way they act can best be understood by comparing the action of a car truck, as it passes around the curve, with a lawn mower. Assume that the leading wheels of the truck are the wheels of a lawn mower, and that the truck frame is the handle of the mower. If one observes a truck as it advances around the curve he will see that the action of the inner front wheel is like that of the lawn mower, in that it tends to move forward in a straight line. This causes the rear wheels to act much as the lawn mower handle does as one pushes it. Close observation will also show that the leading outer wheel is in direct contact with the rail while the inner trailing wheel will have its flanges near or actually touching the inner rail. It will also be observed that both of the inner wheels of the truck participate in a combination of two movements, longitudinal and transverse, in relation to the rail.

On a frosty morning it can be seen readily that slippage of the wheel is actually occurring. This transverse movement is what causes the inner or low rail to flatten out, because it is a grinding action. Furthermore, when this occurs, the low rail is carrying more than its share of the load, except at those rare times already mentioned, where the speed exceeds that for which the curve was elevated.

Tie plates of adequate size to distribute these forces in such a way that the wood fibres are not overloaded, is probably the best method of resisting these forces. The most foolish idea is the belief that additional spikes on the inner side of the rail base can prevent the rail from turning over, and a little reasoning will show why. Assume that one tie per rail length is renewed annually. With 22 ties to the rail it is clear that these ties will vary in age from new to 21 years old, or, as the time for renewal approaches, from 1 to 22 years old. Just how much force is required to pull most of the spikes in this panel?

To test the statement that neither the regular nor the additional spikes resisted to any material degree the tendency of rail on curves to overturn, a 7-deg. curve, at a point where the average engineer exceeded the speed for which the curve was elevated, was selected for a test. During the time the test was under way the track in question carried more than 200,000 gross tons of traffic daily. In preparation for the test, pieces of glass ⅛ in. thick were glued to the top of the rail base under the spike heads. Then

the spikes were driven allowing another 1/8 in. for the wave motion in the rail. At the end of a year, not a single piece of the glass had been broken or crushed. This was practical proof that there is very little overturning movement in rail, except where the tie plates are inadequate for the service in which they are being used. If they are inadequate, the unbalanced forces acting on the rail gradually press the ends of these plates into the tie until the rail is partly overturned. Incidentally, track that is generally regarded as spread on curves will usually be found to be substantially the same gage at the base as it was when laid, except for slight movement and wear of the wood fibres under the plate, caused by unbalanced loading of the plate. Eccentricity is usually more or less a compromise so that the same plates can be used on both curves and tangents.

There are Numerous Causes

By C. M. Chumley
Engineer Maintenance of Way, Illinois Central, Chicago

Superelevation of track not consistent with the speed and weight of the majority of the cars and locomotives moving around a curve; the additional forces necessary on curved track to turn car and locomotive trucks about their axes as the train advances; and failure to maintain accurate line, surface and superelevation or a good tie condition, are the principal causes of a tendency for rail on curves to tip over.

Lateral pressure against the outer rail, caused by centrifugal force, increases with speed and is intensified if the movement of trains is in excess of that for which the track is elevated. The force required to change the direction of the trucks operates laterally against the outer rail, while increased vertical forces act on the inner rail, particularly at low speed, and the direction of this force does not always coincide with the vertical axis of the rail. As a result, there is a gradual settlement of the outer end of the tie plate under the inner rail into the ties and a tipping outward of the rail.

To prevent the tipping of rails, curves should be laid out carefully with respect to line, superelevation, spiral or easement, and they should be well-maintained as thus established. Hardwood ties, and double-shoulder tie plates of sufficient thickness and plan area to provide a satisfactory bearing and a suitable distribution of the load, should be employed. The plates should have a canted rail seat and liberal eccentricity.

Curves of four degrees and sharper should be equipped with gage rods. While most designs of this device offer little resistance against the tipping of the rail, they provide a valuable aid in holding gage. Many years ago it was quite the usual practice to use rail braces on both the inner and outward rails on curves, but with the improvement in designs of tie plates, these braces are now unnecessary.

Good crossties and suitable tie plates on curves are the important factors in preventing the tipping of rails. The inner rail is most affected, but the tipping of this rail takes place gradually and can be corrected through tie or tie-plate renewals. On the other hand, the tipping of the outer rail, resulting from over-sized equipment or excessive speed may give trouble with no advance notice.

Concrete in Cofferdams

When depositing concrete within cofferdams where pumping is necessary, is it safe to stop the pumps at the end of the day, allowing the concrete to be submerged during the night? If so, what are the advantages? What precautions should be observed? If not, why?

Considers It Advisable

By M. Hirschthal
Concrete Engineer, Delaware, Lackawanna & Western, Hoboken, N. J.

An answer to this question cannot be given categorically unless certain modifications or conditions are appended. When the water in which the concrete is being deposited (while it is pumped out) is free from alkali corrosive compounds, or is not highly saline, or not polluted by sewage, it is not only safe but advisable, with certain precautions, to stop the pumps overnight, for this action constitutes a method of curing equivalent to ponding or wet curing for about 14 to 15 hours, which will have a salutary effect on the concrete that has been deposited.

This is particularly true in freezing weather where a sufficient cover of water will act as frost protection for the concrete. In addition, the water at the surface of the concrete when the cofferdam is pumped clear for the next pouring, will aid in bonding the new and old concrete, without the necessity for saturating the old surface with water.

Where the water in which the cofferdam is built is alkaline, corrosive or highly saline, or is subject to pollution from sewage, it is necessary to keep the cofferdam pumped clear at all times and to deposit the concrete continuously from the foundation to a point above the high-water line, to eliminate horizontal joints which always become planes of weakness under these conditions.

The precautions required are, first, that the pumps be kept in operation until the concrete has had its initial set; that before new concrete is deposited, any pools of water lying in the uneven top surface be removed; and that any foreign material or laitance be scraped off thoroughly. Then the surface that is to be in contact with the fresh concrete must be roughened, and the first batch or batches of new concrete must contain an excess of mortar to assure a better bond with the old concrete. Otherwise, the surface of the old concrete should be given a good coating of cement grout for this purpose.

Keeps Cofferdam Pumped

By J. S. Hancock
Bridge Engineer, Detroit, Toledo & Ironton, Dearborn, Mich.

When depositing concrete within sizeable cofferdams where considerable pumping is required, it is our practice to keep the cofferdam pumped out day and night, until the concreting has progressed above the water level and all work inside the cofferdam is completed. I do not consider it unsafe to stop the pumps at the end of the day, permitting any concrete placed to be submerged during the night, provided the concrete has obtained its initial set before being submerged. However, the disadvantage of such a procedure will ordinarily outweigh its advantages.

If the cofferdam is permitted to fill overnight, any concrete submerged should have ideal curing conditions. Furthermore, the pumping time might be reduced, and such a procedure might be advantageous for at least these two reasons. However, as water is readily available, the curing of the concrete by sprinkling after it has taken its initial set requires very little work and is preferable to taking a

chance on some of the cement leaching out of the freshly deposited concrete because of its immersion over night.

However, the principal disadvantage of stopping the pumps at the end of each day's work, thus permitting the cofferdam to refill, is that the cofferdam is likely to lose its seal. When a cofferdam is first unwatered there is usually considerable leakage at the joints of the sheet piling. As the pumping progresses, the leaks are sealed with cinders, sawdust or other suitable material poured into the water on the outside of the cofferdam, close to the leaks.

It may be necessary to continue pumping for an extended period before the leaky joints are sealed. Again, it is sometimes necessary to employ additional pumps during the sealing period in order to lower the water continuously inside the cofferdam so that the work of sealing the leaks will progress satisfactorily until such time as the water entering the cofferdam through the sheet piles is stopped or reduced to the minimum.

Pressure of the water outside the cofferdam is essential to hold the sealing material in place. If the pumps are stopped at the end of the day's work, and the cofferdam is permitted to refill, this pressure on the outside is neutralized and the seal is lost. Even in small cofferdams, resealing at the start of each day's work is ordinarily impracticable and should not be considered for large cofferdams in deep water.

Cofferdams should be made large enough to permit an adequate pump sump to be built inside the cofferdam, to which all drainage should be led. There should be sufficient room between the concrete and the full perimeter of the cofferdam to permit drainage to be carried to the sump without washing cement out of the freshly-deposited concrete.

In the event that there is seepage through the foundation material, an adequate seal coat should be placed, using tremie concrete, before the concrete for the substructure is placed. In some cases, cement grout pumped into place through grout pipes driven or drilled into the foundation material will prove more satisfactory than a concrete seal coat to cut off seepage.

Trends in Pumping Practices

What are the outstanding trends in railway pumping practices? What factors are accelerating these trends? Retarding them?

Modernize Plants

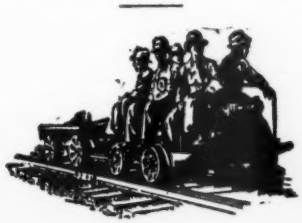
By E. M. Grime
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

During the recent war years it appears that the outstanding trends in railway pumping practices have been first, to modernize pumping plants and at the same time to increase their capacity so that more water can be delivered to locomotives in accordance with the increased demands of a record volume of traffic. The second most important trend has been to make all pumping as nearly automatic as possible, thus aiding in solving the problem of man-power shortage.

This meant that if any steam plants still remained in service, as a rule they should be replaced with gasoline, semi-Diesel or full Diesel power equipment where electric power was not available, thus eliminating the necessity of retaining a skilled man with an engineer's license to handle the plant. Similarly, at points where electric power has become available, it has been found economical and otherwise desirable to replace gasoline-driven equipment by electrically-operated equipment. Even if the power cost is not reduced greatly, electricity is usually extremely desirable because automatic operation thus becomes possible and will, in many instances, eliminate constant attendance.

It might seem that during the war was not a suitable time to modernize, yet the necessity for doing so was greater than ever before, because of the increased traffic demands with respect to both volume of water and speed of delivery. It is also more difficult to modernize at present because of the scarcity of new pumping equipment, which in turn is caused by lack of both material and labor.

Since the railways are now apparently headed for a long period of heavy business, any modernization of facilities that can be accomplished seems highly desirable. Usually, improvements of this kind are not undertaken unless they accomplish some saving in operating cost, and the strong competition now developing in the transportation field makes labor or cost-saving arrangements even more desirable than heretofore.



Automatic Pumping

By Inspector of Water Service

Probably automatically-controlled pumping represents the most outstanding trend in railway water service. This form of control has been made possible largely through the more extensive use of centrifugal pumps and electric motors, for these motors lend themselves to automatic control more readily and more simply than other forms of power.

The centrifugal pump entered the railway field about 30 years ago, despite the fact that those then available were low in efficiency and unsatisfactory in other respects. Furthermore, most of the pumps of this period were of the belt-driven type and were dependent upon gasoline engines for power until the oil engine was developed, which brought the cost of operation within range of that of the reciprocating pump.

As improvements were made in casings; as impeller designs were developed which increased the efficiency of the pumps; and as electric power became more widely available by reason of the extension of power lines through the construction of large central power plants, together with lower rates for power current; directly-connected, motor-driven centrifugal pumps became popular units.

Furthermore, its adaptiveness to automatic control, thereby eliminating the excuse for attendance, added to the popularity of the direct-connected centrifugal pump, with the result that it is replacing other types of pumps. In fact, it is estimated that of the 16,700 water stations now in service on the railways, not less than 3,600 are equipped with motor-driven centrifugal pumps.

The deep-well turbine is designed to meet pumping conditions in practically any well and has made other types of deep-well pumps practically obsolete. The submersible type of deep-well pump, including the motor, is placed below the water level in the well, and eliminates the necessity for a shaft from the surface to the pump. This type of pump is particularly desirable where an extremely deep pump setting is required as it can be oper-

ated at higher speed than a pump with a long shaft.

Diesel engines are now being used as power units in railway pumping, and with the continued development of the smaller sizes and a possible reduction in first cost, they will undoubtedly be used more extensively as power units in railway pumping, for they are more economical in operation, from the fuel standpoint, than any other form of power. They can be operated by automatic control, and thus offer competition to electric power because of their much lower cost of operation. The development and installation of these modern methods of railway pumping have been retarded by conditions incidental to World War II, but there will undoubtedly be a return to normal conditions in the not too distant future.

Floors for Section Tool Houses

Should section tool houses be floored? Why? What is the best type of flooring?

Most Have Dirt Floors

By A. L. Sparks
Architect, Missouri-Kansas-Texas, St. Louis, Mo.

Most tool houses have dirt floors for the reason that at the time they were constructed nothing better was considered necessary. Coal-burning roads have many such houses floored with locomotive cinders, while on other roads, many are floored with ballast or screenings, because these are the most readily-obtained materials that will keep the floors out of the mud, without an approved requisition.

Wood crossing plank have often been used, and it is surprising to find how much good scrap material can find its way into such use. Old paving blocks are sometimes culled and laid on an earth fill.

In dry territory where there is little rain and no snow, the dirt, cinder or ballast floor probably serves the purpose satisfactorily, but where there is much dampness, cinders cause corrosion of metal, while dust from the other materials mentioned, makes it difficult to keep the stock of supplies clean. The wood plank floor is cleaner and keeps the stock of supplies and tools cleaner, but since oil is frequently kept in the tool house, it presents a greater fire risk.

A concrete slab laid directly on an earth mound tamped and shaped to slope away from the building, overcomes the foregoing objections and will prolong the life of the structure with less maintenance cost.

Sometimes, as an objection to the concrete floor, an objector will say that "the building needs to be moved and there is no salvage to be obtained from a concrete floor." Neither will there be any salvage from the other types. With good sills bolted to the concrete, the building would be in better condition for moving than if set on the dirt. Furthermore, the abandoned concrete slab will make a good setting-out station for the motor car when the gang is working in the vicinity.

Prefers Concrete

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Section tool houses have evolved from former simple frame structures with dirt floors for housing hand cars, a few simple hand tools, flagging equipment, and track materials, such as lock washers, switch bolts and other small items. It was also customary to store a small amount of black oil for the hand car, and lard oil for the switch lamps was kept in one corner. With such simple housing, a dirt floor was satisfactory and economical, since the entire investment was small and no particular fire hazard existed.

The advent of section motor cars, power tools, track signaling and switch interlocking changed all this, increased many fold the investment in the things housed, and also increased the fire hazard materially because of the flammable supplies necessary for the powered equipment. A floor that did not raise dust that might get into the machines, that could be kept free of oil and grease, and that could be kept clean otherwise, became a good and economical investment. Concrete floors placed in connection with concrete foundations fill all needed requirements from a physical point of view, but the economies of concrete for all locations must be studied.

Branch lines of light traffic, or lines that may be in line for abandonment because of lack of traffic, do not justify tool houses with concrete floors, because, in the case of the former it may be found necessary to change the gang arrangements for maintenance purposes, while in the latter, cessation of need for maintenance is imminent. In either case, the concrete floors and foundations could not be salvaged and would, therefore, constitute a loss. Whether tool houses for such lines should be floored at all is a subject needing local study.

Section limits or maintenance arrangements on important through lines are subject to change, so that it would be best economy to floor section tool houses with wood or other recoverable materials where the section headquarters may be abandoned or moved. However, a good floor that can be kept clean should be provided.

Fireproofed Wood for Buildings

To what extent is it feasible to give lumber and timber for buildings fire-retardant treatment? Should this replace preservative treatment? To what extent? How is painting affected?

Is In Favor of It

By Supervisor of Buildings

While we ourselves have not been afflicted seriously with fires, I am aware that the railways as a whole sustain considerable fire loss and that much thought is being given to a reduction of these losses by a special organization of fire-prevention officers among the roads. In my own opinion fire-retardant treatments offer an opportunity to reduce fire losses at reasonable cost; in fact, at lower cost than any other method.

This can be done when constructing new buildings, when making major repairs or alterations to old buildings and even to structures upon which no repairs or only minor repairs are needed. In other words, this can be done by applying only wood that has been given fire-retardant treatment when constructing a new building; by giving fire-retardant treatment to all of the lumber and timber used when making major repairs or alterations; and by providing curtains and partitions of plywood or other relatively thin material that has been given fire-retardant treatment, in existing buildings, as well as to enclose trusses and

important exposed members with similar material.

A fact that is usually overlooked when considering the fire risk and the fire resistance of wooden buildings is that wood possesses some of the properties that are needed most urgently in case of fire. Heavy timbers, even when untreated, have greater resistance to reduction in strength and, therefore, to collapse, than steel. For this reason, their load-carrying capacity is impaired at a much slower rate than steel when subjected to the same temperature. Because of this quality it often happens that wooden structures are saved, when a similar structure with steel members would have been destroyed. In other words, the small margin of time afforded to bring the fire under control may save large sums required for replacement.

It should not be overlooked, however, that the wood contained in the structure is seldom the only combustible material which may contribute to the severity of the fire. For this reason, no measure of precaution and supervision should be relaxed, even though the wooden members of the structure have been given fire-retardant treatment.

It Is Entirely Feasible

By General Building Inspector

I want to make it plain that I consider the fire-retardant treatment of lumber and timbers for railway buildings entirely feasible. This is a subject that has been discussed at length for many years, but like Mark Twain's weather, no one did anything about it until the shortage of steel during the war made the use of timber for large structures imperative. Then government agencies, principally the navy, stepped in and demanded fire-resistant treatment for many million feet board measure of lumber to be used in the construction of hangars for the patrol blimps that were used for scouting enemy submarines off our shores. This created an interest in and a knowledge of fire-resistant treatments much wider than at any previous time, and it is hoped that this interest and knowledge will not be allowed to lapse.

The railways have a multitude of buildings that can be "fireproofed" to decided advantage and, while I do not have any actual data to substantiate the suggestion, I am convinced that the fire losses that could be avoided by a general use of fire-retardant treatment are sufficient to pay for this form of treatment on any road, assuming that all lumber used in the construction and modernization of buildings is given this treatment.

Enginehouses constitute an important class of buildings for which fire-retardant treatment should be considered. While the walls and floors are generally constructed of non-combustible materials, most such structures have wooden roofs which are subject to considerable fire risk. The destruction of an enginehouse tends to throw the handling of locomotives into confusion and is extremely detrimental to train schedules. Fire-retardant treatment for the roof members would reduce this risk measurably, and in the long run I am sure that it would pay for itself many times over. The same is true of coaling and sanding facilities. While it is my firm conviction that the structures housing these facilities should be constructed of non-combustible materials, many of those now in service are of wooden construction and not a few of such construction are being built currently, although the practice is by no means as common as it was a few years ago.

While station and office buildings generally have a much lower fire hazard than the types already mentioned, the destruction of either often causes incidental losses that are greater than the value of the building itself. It is my firm conviction, therefore, that when constructing new buildings of these types, or when making major alterations to them or enlarging them, all of the lumber and timber used for these purposes should be given fire-retardant treatment. One could go down through the list of the more than 100 types of buildings used by the railways and, except for those constructed of non-combustible materials, find some advantages in fire-retardant treatment for almost all of them.

So far as I am informed, none of the fire-retardant treatments affect painting either favorably or adversely. While these treatments are not claimed to repel termites, most of them have considerable preservative value, but should not be depended on where the wood comes in contact with water, for the fire-retardant chemicals are easily soluble.

Punching in Tie Plates

Should the punching in tie plates for the rail spikes be larger, smaller or of the same size as those for the hold-down spikes? Why? What should be the dimensions with reference to the spikes?

Make Them the Same Size

By Supervisor of Track

I presume that it is exercising poor judgment to disagree with the American Railway Engineering Association, but its standard with respect to the punching of tie plates does not agree with my experience. This standard calls for ¾-in. holes for the rail spikes and 11/16-in. holes for the anchor or hold-down spikes. As I view the matter, this is a throwback to the time when we used single-shoulder tie plates and obviously had to hold the rail from coming in.

If I had my way, and I did a lot of experimenting before I reached this conclusion, I would punch the holes all the same size and depend on the shoulders of the plates to hold the rail in place, as they are designed to do and must do. I would also use a full-throated spike that would be big enough to fill the punched holes in the plates. In this way all spikes would act as hold-down spikes.

My experiments were with 5/8-in. spikes, with the last inch near the head broadened to ¾ in., and all holes in the plates were ¾ in. When these spikes were driven home the holes were sealed, as well as might be, against the entrance of moisture and, fully as important, all of the spikes in a plate acted in unison to hold the plate against movement in any direction. These plates were installed at points of hardest usage, where traffic was heavy and train speeds were high. They stood up under the severest abuse, saving wear on ties and extending their life to about double that of the ties on adjoining sections where plates with different-sized holes were installed and the spikes were 5/8 in. without the full throat.

Where the A.R.E.A. standard punching was employed, the trackmen drew the spikes into the rail as they drove them and, in turn, drew the rail base away from the shoulder. The spikes, therefore, took all of the load required to hold the rail in place, so that in a short time they become throat cut and the rail moved out against the shoulder. Furthermore, the tie plates began to move in a short time, and on rainy days they pumped up a little mound of water and

ated at higher speed than a pump with a long shaft.

Diesel engines are now being used as power units in railway pumping, and with the continued development of the smaller sizes and a possible reduction in first cost, they will undoubtedly be used more extensively as power units in railway pumping, for they are more economical in operation, from the fuel standpoint

any other form of power. They can be operated by automatic control, and thus offer competition to electric power because of their much lower cost of operation. The develop... installation of these... of railway pur... ed by co... Wa...

...ads, tends ...ast, but usu- ...than any other most careful at- ...maintenance forces. ...n, some method of ...el ballast should save ..., compared with the present ...of discarding and replacing ...tire ballast section.

...ay experience leads me to believe ...at the coarse aggregate should range in size from ⅛ to ¾ in., well graded. Any pebbles larger than ¾ in. should be crushed and returned to the ballast. There should also be enough sand, say 15 to 25 per cent, depending largely on the size and shape of the pebbles, to act as a binder for the larger pebbles in the ballast.

Comes from Many Sources

By Assistant Engineer of Maintenance

The specifications of the American Railway Engineering Association for gravel ballast are the result of extensive investigation and consultation with many gravel companies. They lend themselves to modification to suit local conditions, which is often necessary because of wide variations in both the quality and availability of gravel. They have been drawn up with the view of meeting, as nearly as practicable, the requirements of the railways, standard testing methods, and the ability of manufacturers to produce. It is suggested that those interested refer to the 1943 and 1944 Proceedings of the A.R.E.A., which contain valuable data on the subject.

These specifications meet the general requirements of a good gravel ballast, in that the maximum size of 1½ in. permits small lifts for light surfacing, which is necessary because of present-day high-speed requirements for good track surface. The gradations specified provide a firmly-compacted, stable ballast, with the practicable minimum of voids, which reduces the probability of the ballast becoming fouled with foreign substances and saturation by rains. Desirable soundness of materials and methods of determining them are outlined. The desired cleanliness and the limitations of deleterious materials are also specified.

Because of wide variations in the quality of gravel obtainable, good judgment must be exercised in drawing up the specifications, taking into account traffic requirements, availability of materials and their cost. Under such an analysis, in many instances, pit-run gravel may be more satisfactory than graded ballast.

...ere
...king the
... convinced
...make the hole
...bsolutely neces-
...the smaller hole
...be less movement of
...esides gaining the ad-
...naving all of the spikes
...e act more nearly in unison.
...ars that spike holes 1/16 in.
...r than the spike are ample. On
...r road for instance, we changed
years ago from holes ¾-in. square for ⅝-in. spikes to 11/16-in. square for both line and anchor spikes, and we have never received any complaints that these holes were too small.

...ere no
...e hole;

What Sizes for Gravel Ballast?

What characteristics should a satisfactory gravel ballast possess? What range of sizes is most desirable? Why?

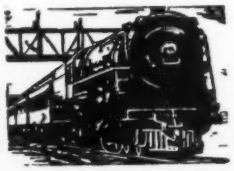
Best From Inland Pits

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

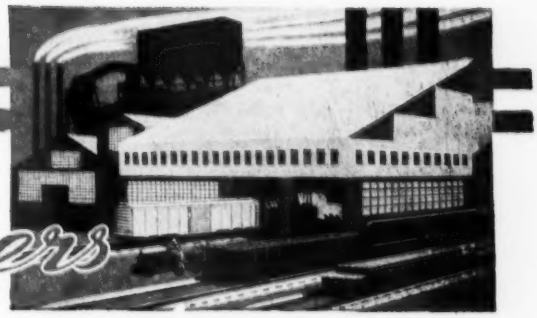
It is difficult to give a suitable answer to this question, primarily because perfection in ballast materials must always give way to the availability of material that can be used as ballast. Sometimes we are compelled to accept gravel that is by no means ideal, in order to get material necessary to replace the worn-out and dirty ballast that is in service. This situation is aggravated at present by the fact that during the war the government demand for gravel was so great that some of our best gravel pits were entirely depleted and we must now discover new sources of supply of this material.

In general, the best gravel, from the standpoint of its use as ballast, comes from inland pits, that is, pits that are away from creeks and rivers. Gravel from deposits in or connected with active streams is usually characterized by worn and rounded pebbles and by an excess of sand. Even after crushing the larger stones it is difficult and often impossible to apportion the sand content so that both it and the large aggregate do not roll away from the ends of the ties, because the sand itself is composed of well-worn rounded grains. Center-bound track is almost the invariable result of using such gravel.

Gravel ballast should be clean and hard, and the sand content should be sharp. It will be better if it contains only as much sand as is needed for a binder. It will also be preferable if the pebbles are of a size that will permit cleaning with a ballast cleaner. Dirt that accumulates from cars, es-



PRODUCTS of Manufacturers

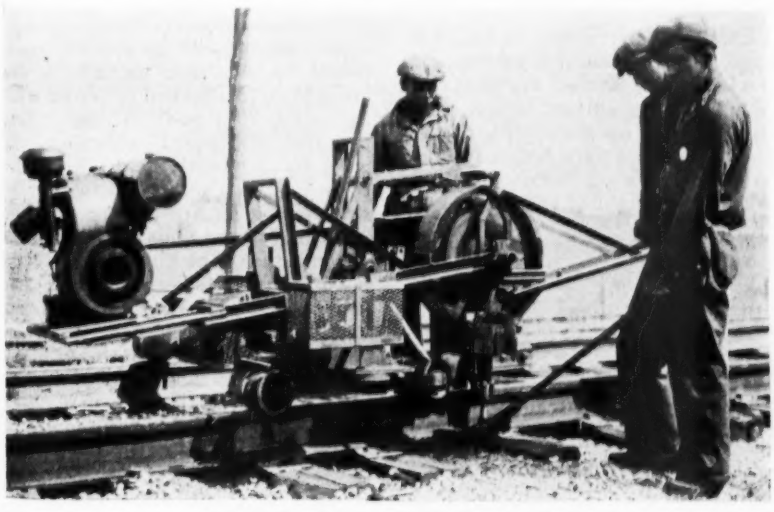


New Nordberg Spike Driving Machine

THE Nordberg Manufacturing Company, Milwaukee, Wis., has added a new mechanical spike driving machine and a spike holder to its line of power track tools and equipment, the spike holder being furnished in pairs with the spike driving machine. The new spike driver is a self-contained unit weighing approximately 600 lb., and consists essentially of a full-revolving frame containing all of the driving mechanism, mounted on a carriage that is rolled easily along the rails from spiking position to spiking position. The revolving frame is a balanced beam with a revolving mechanical hammer on one end, and a 6-hp., four-cycle, single-cylinder, air-cooled gasoline engine, which drives the hammer by means of three V-belts, mounted on the opposite end.

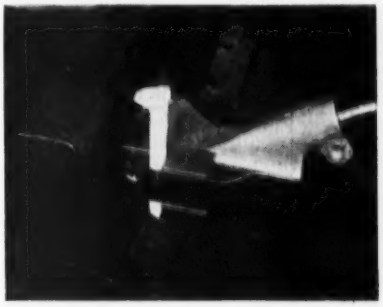
The spike-driving mechanism consists of a rotating steel spider in which is mounted the revolving hammer. Directly beneath the revolving hammer in its striking position is an anvil guide which carries an anvil 10 in. long. This anvil receives the rapidly repeated blows from the hammer and delivers them to the head of the spike. The movement of the anvil in the guide is limited, and its upper end normally hangs down out of the path of the revolving hammer. When the lower end of the anvil is placed on the head of the spike for driving, the upper end is pushed up into the path of the revolving hammer, which then drives the spike into the tie. When the spike has been driven into place and the revolving hammer is raised, the anvil drops out of its path, and the hammer rotates freely. The travel of the anvil in the guide may be adjusted for wear. Furthermore, the anvil guide extends below the lower or striking end of the anvil, thus forming a circular wall, or retainer, to keep the head of the spike directly under the anvil.

The revolving hammer weighs 28 lb. However, rotated at a speed of 1100 r.p.m., it strikes blows of 4,000 lb. The actual time required to drive a ⅝-in. spike into an oak tie is said to be from one to two seconds.



The Spike Driving Machine in Operation

The spike hammer drives one spike at a time, working on only one rail at a time, but through the swing of its frames, it can be moved from one side of the rail to the other to permit the driving of spikes on both sides of the rail. Spikes may be driven close to the base of the rail or through any hold-down spike holes in the tie plates, and it is said that all spikes are driven vertically as the machine is so constructed that it will not drive a spike unless it is started right and goes in straight. Another feature of the machine is that it is provided with suitable screw stops which make it impossible to injure the base of the rail, regardless of the rail height. These stops can be set to prevent over-driving or to hold the heads of the spikes ⅛ in. or so above the base of the rail, if desired, to allow for wave motion in the rail or to permit easy tie spacing.



How the Spike Holder Is Used

The frame of the machine, being full revolving, permits the machine to be operated in either direction on either rail. Spikes may be driven in switches as much as 2 ft. from the gage line of the rail on which the machine is being operated.

A crew of three men is required for the operation of the machine, consisting of an operator and two men with spike holders for placing these spikes in position for driving. While a spike is being driven on one side of the rail with the assistance of one of the men with a spike holder, the man on the other side of the rail places a spike in his holder and has it in position for driving by the time the operator swings the machine

over. A basket containing the spikes is carried on each side of the frame within convenient reach of the two men with the spike holders to permit their obtaining new spikes without picking them up off the ground.

The spike holders each weigh approximately six pounds and consist of a specially shaped metal block, with a handle, in which the spikes are placed vertically, one at a time, and are held against a hardened steel guide by a spring. The handle is 3½ ft. long, which permits the spikes to be placed in position for driving without the necessity for the men to stoop over. As soon as a spike is partially driven, the holder is pulled out of the path of the anvil and is reloaded.

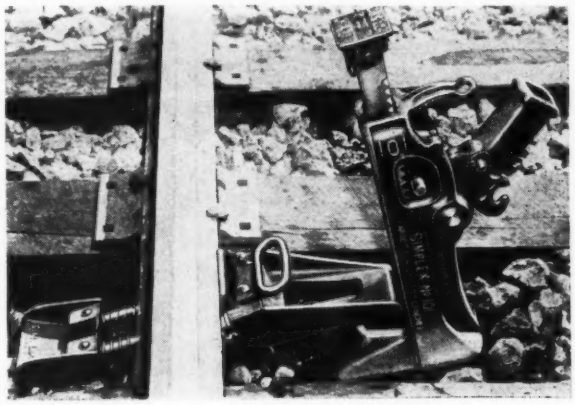
The first of the new Nordberg spike driving machines to be built is said to have been in successful operation on several roads throughout the last working season, and it is claimed that records obtained indicate that, with a crew of three men, with little or no previous experience, it can drive approximately 800 spikes an hour.

New Tractor-Drawn Open-Bowl Scrapers

THE Caterpillar Tractor Company, Peoria, Ill., has announced the production of three sizes of tractor-drawn open-bowl scrapers, matched in capacity to the power of various Caterpillar Diesel tractors, and built to perform with them as complete earth-moving units. The new scrapers, designated as Nos. 60, 70 and 80, have struck-measure capacities of 13.8 yd., 8.7 yd. and 6.0 yd., respectively. The claim is made that the addition of these scrapers, and the recently-announced Caterpillar bulldozers, to the line of Caterpillar products, has had the effect of producing the first matched earth-moving equipment of this type to be designed and built by one manufacturer.

The features claimed for the new scrapers include open-bowl design for greater stability, visibility and access for shovel or dragline loading; high apron lift to clear sticky material; positive clean ejection; long cable life through correct reeving; oversize precision — grooved sheaves; double-curved self-sharpening cutting edges for live loading with long boiling action and for digging hard material; short loading distance and less loading time; together with optional tire sizes for correct flotation, minimum rolling resistance, larger loads and longer tire life.

One of the New Scrapers in Operation



A Service View of One of the New Simplex Track Shifters

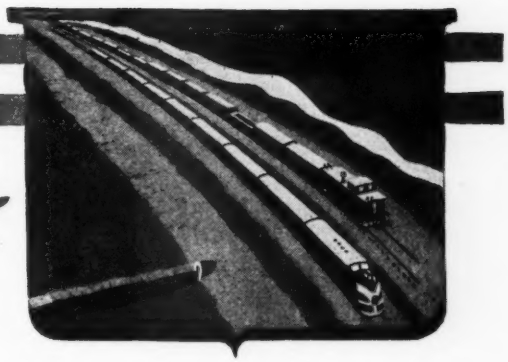
New Track Shifter

TEMPLETON, Kenly & Co., Chicago, has introduced a new type of track shifting device, known as the Simplex track shifter, which is designed to be operated with the aid of conventional track jacks. The new shifter is claimed to be capable of lining any weight of rail in any type ballast, and to be equally suitable for lining swings, sharp or flat curves, frogs, turnouts, crossovers and ladder tracks. Using this shifter it is said to be possible to line track through short road crossings without taking up one board or digging out the topping. It is used in sets of two, and is said to permit track to be lined with a gang of four men.

Weighing only 40 lb., the Simplex track shifter consists essentially of two specially-shaped castings separated by two round shafts each incorporating a movable bushing. When in use the two shifters in each set are placed under the rails at points opposite each other in holes located as desired and prepared in advance. When each shifter is in position for operation, one of its castings is partially imbedded in the ballast, while the other, on the opposite side of the rail, is engaged by a track jack which is tilted well forward. As the end of the shifter is raised by the jack the shafts are brought to an inclined position, with the result that the bushings move laterally downward, carrying the track forward with them. When the track has been moved as far as desired the jacks are tripped and the track is dropped with a solid impact which is said to be highly effective in restoring it to its former grade. The shifters are said to employ an advancing fulcrum principle that actually gives more leverage the farther the track is thrown. When the shifter is not in use coil springs around the shafts hold the movable bushings in the normal position against the casting at the jack end.

RAILROAD SCHOOLS—The National Railways of Mexico, in co-operation with the program of the federal government to raise the standards of literacy in that nation, have established a number of schools for railroad workers.

NEWS of the Month



Foreman Honored for Heroic Deed

Roy A. Powers, a track foreman of the Chicago, Milwaukee, St. Paul & Pacific, was awarded a bronze medal by the Bureau of Safety of the Interstate Commerce Commission for his act in rescuing an aged woman from the path of an approaching passenger train on the line of the Chicago, Burlington & Quincy at Rockford, Ill., June 14, 1943. Although they were struck by the train, Mr. Powers' action is believed to have prevented the woman's receiving fatal injuries. As a result of injuries sustained in the rescue, Mr. Powers was confined to a hospital for more than a year after the accident.

1945 Ton-Mile Total 8.2 Per Cent Under 1944

The volume of freight service handled by United States Class I railroads in 1945 amounted to 677 billion ton-miles, a decrease of 8.2 per cent below the 737 billion reported for 1944, according to preliminary figures made public by the Association of American Railroads. Reflecting the drop in traffic following the end of the war, the total for the first 10 months was 585 billion ton-miles, 5.7 per cent under 1944's ten months' total of 620 billion ton-miles, while in November the total of 50 billion ton-miles represented a decrease of 16.1 per cent below November of 1944, when 60 billion ton-miles were reported. For December 1945 the total was 42½ billion ton-miles, 25.8 per cent below the 57 billion ton-miles recorded in that month the previous year.

Box Car Supply Still Short; Gondolas and Flats Plentiful

In his monthly report on the transportation situation, W. C. Kendall, chairman of the Car Service Division of the Association of American Railroads, revealed that despite the "current difficulties in the industrial reconversion program," the supply of freight cars remains tight, particularly with respect to box and refrigerator cars.

Box cars, according to Mr. Kendall, are in greatest demand in the West, although the supply is not easy in any section of the country. With respect to coal cars, there remains a heavy demand, although gondola cars are reported as plentiful, except in the Pacific Northwest. Flat cars in general are considered plentiful.

Concerning troop movements, Mr. Kendall revealed that the peak military movement of the war was reached in December, when over 1,000,000 men were transported in organized movements by the nation's railroads.

Labor Shortages Decline

Unfilled openings for railway employees continue to decline, the total men needed as of December 31, 1945, being 40,925, compared with 50,262 on November 30, and 84,954 on December 31, 1944, according to the latest report of the Railroad Retirement Board. By occupations the railroads were short 10,521 extra-gang laborers and 10,375 sectionmen, or half of the total shortage. By regions, needs for trackmen were as follows: Atlanta, 966 extra-gang men and 705 sectionmen; New York 1,214 extra-gang men and 2,783 sectionmen; Cleveland, 1,906 extra-gang men and 914 sectionmen; Chicago, 1,210 extra-gang men and 1,717 sectionmen; Dallas, 300 extra-gang men and 827 sectionmen; Kansas City, 973 extra-gang men and 1,163 sectionmen; Minneapolis, 323 extra-gang men and 325 sectionmen; Denver, 671 extra-gang men and 1,025 sectionmen; and San Francisco, 2,955 extra-gang men and 916 sectionmen.

ICC Reports on Accidents Due to Track Conditions

According to the annual report of the Bureau of Safety of the Interstate Commerce Commission, that body investigated 26 derailments during the fiscal year ended June 30, 1945, 12 of which were due to track conditions. Of these, three accidents were the result of broken rails, due to transverse fissures; one was caused by a combination of wide gage of track and excessive speed on a sharp curve; one by a defective switch; three by improperly maintained turnouts; another by insecure condition of the track; two by obstructions on the track; and one was due to a washout. In addition to the above the commission reported on two collisions involving track motor cars. One of these was found to have been caused by failure to enforce regulations governing operation of track motor cars, and the other one was due to the operation of track motor cars without protectin against opposing train. As a result of its investigation of one accident, the commission recommended that the carrier establish maximum authorized train speed consistent with the condition of the track.

Maintenance Men to Arbitrate Wage Dispute with Railroads

Representatives of the carriers and of 18 railway labor organizations, including the Brotherhood of Maintenance of Way Employes, agreed, on January 26, to arbitrate their dispute as to a proposed wage increase. At issue was a demand by 15 non-operating railway labor unions for an increase in wages of 30 cents an hour. By signing the arbitration agreement the unions and the carriers' managements bound themselves to abide by the decision of the arbitration boards yet to be appointed. It is expected that proceedings will begin about the middle of February.

The agreement to arbitrate ends the threat of a strike of some 1,300,000 railway employees, although there still remains a possibility of strike action by two others of the five operating unions, the Brotherhood of Railroad Trainmen and the Brotherhood of Locomotive Engineers. The trainmen's organization expected to complete a strike vote about February 1, while the engineers' union was to consider the matter of calling for a strike vote at about the same time.

Sleepers Return to Regular Runs March 15

The Office of Defense Transportation, last month, announced that, effective February 15, sleeping cars may be restored to runs of 351 miles and over, and that, effective March 1, sleeping car runs of more than 251 miles may be restored. By March 15 all restrictions on sleeping car operation will be eliminated, according to the O.D.T.

J. Monroe Johnson, director of the O.D.T., in making the announcement, said that although the complete revocation of the restrictions affecting sleeping car operations will withdraw from exclusive military service 895 sleeping cars, there will still be available more sleeping cars for military use than were available for such purposes during the peak movement of December, 1945, due to the completion of a government order for 1,200 troop sleeping cars, while at the same time the movement of troops is declining in volume.

Also effective March 15, will be the removal of the O.D.T. limitation on advance reservation of railroad passenger accommodations, now 14 days, leaving the carriers free to "make such arrangements as they please" as to the acceptance of advance passenger space reservations.

Changes in Railway Personnel

General

Paul J. Seidel, track supervisor on the Erie, at Hornell, N.Y., has been appointed inspector of operation, with headquarters at Cleveland, Ohio.

J. C. Jones, superintendent of the Moose Jaw division of the Canadian Pacific, and an engineer by training and experience, has been promoted to general superintendent of the Alberta district, at Calgary, Alta.

J. W. Smith, assistant chief engineer of the Seaboard Air Line, with headquarters at Norfolk, Va., has been promoted to assistant general superintendent, with headquarters at Savannah, Ga.

J. N. Fraine, assistant superintendent on the Canadian Pacific, at Schreiber, Ont., and an engineer by training and experience, has been transferred to the Bruce division, with headquarters at Toronto, Ont.

J. M. Mitchelhill, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Aberdeen, S.D., has been appointed assistant manager of the Ponce & Guayama, with headquarters at Central Aquirre, Puerto Rico.

Paul E. Feucht, general manager of the Western region of the Pennsylvania, at Chicago, has been transferred to the Central region, at Pittsburgh, Pa., succeeding **John C. White,** who has been elected vice-president, at New York, replacing **George Le Boutillier,** who has retired after more than 50 years of service. **Herman H. Pevler,** general superintendent of the Eastern division, at Harrisburg, Pa., succeeds Mr. Feucht as general manager of the Western region at Chicago, and **James P. Newell,** general superintendent of the Southwestern division has been transferred to Harrisburg, replacing Mr. Pevler. Each of these men is an engineer by training and experience. A photograph and biographical sketch of Mr. Feucht were published in the March, 1945, issue.

O. B. Keister, Jr., superintendent of the New Orleans & Northeastern (part of the Southern system), at Hattiesburg, Miss., has been transferred to the Alabama Great Southern (also part of the Southern), succeeding **D. W. Brosnan,** whose promotion to chief engineer of maintenance of way of the Western lines of the Southern, is reported elsewhere in this issue. **W. H. Oglesby,** superintendent of the Mobile division of the Southern, at Sheffield, Ala., has been transferred to the New Orleans & Northeastern, at Hattiesburg, replacing Mr. Keister, and **F. A. Burroughs,** assistant superintendent of the Birmingham division, at Sheffield, Ala., has been promoted to superintendent at Selma, succeeding Mr. Oglesby. Each of these men is an engineer by training and experience.

J. P. Allison, an engineer by training and experience, whose promotion to superintendent of the Marion division of the Erie, at Huntington, Ind., was reported in the December issue, was born at Baltimore, Md., on July 3, 1905, and received his higher education at Cornell University, from which he was graduated in 1928 with the degree of civil engineer. He entered railroad service on April 1, 1929, in the maintenance of way department of the Erie, holding various positions until May, 1940, when he was promoted to track supervisor at Jersey City, N.J. From February, 1941, to August, 1944, Mr. Allison served as trainmaster, with headquarters at Hornell, N.Y., Dunmore, Pa., and Meadville. In September, 1944, he was advanced to assistant superintendent of the Marion division, with headquarters at Chicago, the position he held at the time of his recent promotion.

C. L. Persons, whose retirement as assistant to the executive vice-president of the Chicago, Burlington & Quincy, with headquarters at Chicago, was reported in the January issue, was born at Wadsworth, Ill., on August 4, 1872, and received his higher education at Drake University, Des Moines, Iowa. He entered railroad service on October 15, 1904, as head chainman on the Burlington, at Chicago, and was promoted to transitman during the same year, later serving as resident engineer and locating engineer at various places in Illinois, Missouri and Wisconsin, with headquarters at Chicago, until April, 1917. For a few months in 1917 he was surveyor for a government plant at Belleview, Ill., and later in the same year he was in charge of construction on the Metropolis Bridge project. During part of 1917 and 1918, Mr. Persons was in charge of the track elevation at Aurora, Ill. In August, 1918, he was promoted to assistant chief engineer, Lines east, with headquarters at Chicago, and served in that capacity until May, 1939, when he was advanced to assistant to the executive vice-president.

Engineering

Duval M. Lamdin, assistant to chief engineer of the Atlantic Coast Line, with headquarters at Wilmington, N.C., has retired from active service.

R. L. Milner, assistant division engineer on the Chesapeake & Ohio, at Covington, Ky., has been promoted to special engineer, at Richmond, Va.

The titles of all assistant engineers in the division engineer's offices of the Illinois Central System have been changed to assistants to the division engineer.

R. H. Snyder, assistant engineer-buildings of the Western lines of the Southern, at Cincinnati, Ohio, has been promoted to assistant architect, with the same headquarters.

Hugh J. Phillips has been appointed engineer maintenance of way of the New York Aontario & Western, at Middletown, N. Y., a newly created position. Mr. Phillips has assumed the duties of **Frank J. Meyer,** who has resigned as chief engineer to accept private employment, as reported elsewhere in these columns, and the position of chief engineer has been abolished.

George A. Noren, whose promotion to chief engineer of the New York Central, Lines Buffalo and East, was reported in the December issue, was born in New Britain, Conn., on April 6, 1886, and entered railway service in 1910, as a rodman with the Pennsylvania. In 1911 he went with the Monterey Electric Railway, Light & Power Co., Monterey, Mex., and

George A. Noren

also engaged in private engineering practice there. In 1912 he joined the staff of the New York Central as assistant engineer, becoming resident engineer at Poughkeepsie, N.Y., in 1916; assistant district engineer, Central district, in 1917; engineer grade crossings, New York, in 1920; and in 1924, designing engineer. Mr. Noren was promoted to engineering assistant to vice-president, at New York, in 1927, and to engineering assistant to executive vice-president, system, in 1932, the position he was holding at the time of his recent advancement.

Leslie Day, track supervisor on the Belt Railway of Chicago, has been appointed assistant engineer on the Chicago & Western Indiana, an affiliated line, with headquarters at Chicago.

C. H. Wiggins, assistant master carpenter on the Seaboard Air Line, has been promoted to assistant division engineer, with headquarters as before at Jacksonville, Fla.

H. L. Barr, just released from service in the armed forces, has returned to the Chicago & North Western as division engineer of the Black Hills division, with headquarters at Chadron, Neb.

R. F. P. Bowman, roadmaster on the Canadian Pacific, at Lethbridge, Alta., has been promoted to division engineer, at Brandon, Man., succeeding **D. J. Martin,** who has resigned to enter other business.

H. W. Jensen, just released from service in the armed forces, has returned to the Chicago, Saint Paul, Minneapolis & Omaha as division engineer of the Western division, with headquarters at St. Paul, Minn.

W. C. Oest, office engineer of the Ft. Worth & Denver City, at Fort Worth, Tex., has been promoted to principal assistant engineer, with the same headquarters, a newly-created position.

W. H. Goold, who has been on leave of absence to serve in the armed forces, has been appointed assistant engineer on the New York Central, Lines West of Buffalo, with headquarters at Detroit, Mich.

J. A. Erskine, bridge draftsman on the Chicago, Rock Island & Pacific, at Chicago, has been appointed assistant engineer of bridges and buildings of the Alton, with headquarters at Chicago, a new position.

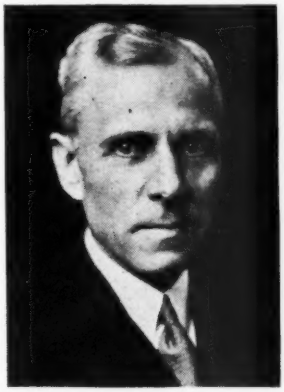
S. R. Mitchell, assistant engineer of the Minneapolis, Northfield & Southern, at Minneapolis, Minn., has been promoted to chief engineer, with the same headquarters, succeeding **F. U. Mayhew,** who has retired after 45 years of railroad service.

Robert B. Jones, whose promotion to assistant chief engineer, system, of the Canadian Pacific, at Montreal, Que., was reported in the January issue, was born on March 21, 1885, at Glasgow, Scotland, and

Robert B. Jones

obtained his early experience in railway engineering with a railway in England. From 1906 to 1910, he served in an engineering capacity with a private concern. At the end of this period he entered the service of the Grand Trunk Pacific (now part of the Canadian National), where he served as a draftsman, transitman and building inspector on the construction of the terminal at Fort William, Ont. While with this company he was also engaged in preliminary and location survey work in Saskatchewan. From 1913 to 1915, Mr. Jones served as a draftsman and transitman with the Canadian Pacific on yard design and on track revision surveys along the north shore of Lake Superior. During War I he served with the Canadian Field Artillery overseas as a gunner, sergeant and lieutenant, returning to the Canadian Pacific in 1919 as an assistant engineer in the office of the chief engineer. In February, 1939, he was advanced to engineer of track, with headquarters at Montreal.

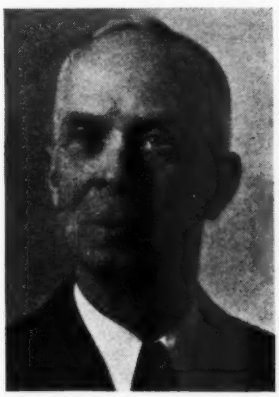
H. B. Barry, whose promotion to chief engineer of the St. Louis-San Francisco, with headquarters at Springfield, Mo., was reported in the January issue, was born at Hillsboro, Ill., on May 19, 1880, and received his higher education at the University of Illinois. He entered the service of the Frisco on August 16, 1906, as an instrumentman in the district engineer's office at Monett, Mo., and became assistant engineer at Memphis, Tenn., on November 20, 1906. In April, 1911, he was promoted to district engineer at Chaffee,



H. B. Barry

Mo., and on March 1, 1920, he was further advanced to principal assistant engineer in the chief engineer's office at St. Louis, Mo. On May 1, 1929, Mr. Barry was promoted to assistant chief engineer, first at St. Louis and later at Springfield, the position he held at the time of his recent promotion.

Harry J. Seyton, whose promotion to chief engineer of the Great Northern, with headquarters at St. Paul, Minn., was reported in the January issue, was born at Richmond, Ill., on June 25, 1882, and was graduated from the University of Wisconsin in 1905. He entered the employ of the Great Northern as an instrumentman in 1909, and two years later he was promoted to assistant engineer in the construction department. In 1915 he was transferred to the valuation division and the following year he returned to the construction de-



Harry J. Seyton

partment in the same capacity. Mr. Seyton was advanced to district engineer of the Central division, with headquarters at Great Falls, Mont., in 1917, and on March 1, 1920, he was transferred to Duluth, Minn. In 1925, his jurisdiction was extended from Duluth to Williston, N.D. In January, 1939, he was further advanced to assistant chief engineer, Lines West, with headquarters at Seattle, Wash., and served in that capacity until his recent promotion to chief engineer at St. Paul.

D. W. Brosnan, superintendent of the Alabama Great Southern (part of the Southern system), at Birmingham, Ala., has been promoted to chief engineer, maintenance of way and structures, Western lines of the Southern, with headquarters at Cincinnati, Ohio, succeeding **A. A. Woods,** who has retired after 50 years of years of service.

W. G. Dyer, whose promotion to engineer of track of the Canadian Pacific, at Montreal, Que., was reported in the January issue, was born in Saskatchewan and entered railway service as a rodman on the Canadian Pacific at Regina, Sask., while attending the University of Saskatchewan. He was graduated in 1928 and entered the service of the Canadian Pacific on a permanent basis as a building inspector, with headquarters at Saskatoon, Sask. Mr. Dyer later served in various capacities at different points on the road,

W. G. Dyer

advancing to resident engineer, with headquarters at Moose Jaw, Sask. In 1941 he was promoted to division engineer at that point, and in 1943 he was transferred to Penticton, remaining in that location until his new promotion.

H. B. Christianson, formerly division engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Savanna, Ill., and who now returns from military service, has been appointed assistant to the chief engineer, with headquarters at Chicago.

J. H. Gill, division engineer of the Seaboard Air Line, at Savannah, Ga., has been promoted to assistant to the chief engineer, with headquarters at Norfolk, Va., succeeding **J. R. Traphoner,** who has been assigned to other duties.

J. Burdette Morran, executive assistant of the International, at Buffalo, N.Y., has been appointed engineer of way, with headquarters unchanged, succeeding **Henry E. Riexinger,** who retired on November 1, 1945, after 35 years of service.

J. B. Wilson, principal assistant engineer of the Atlanta, Birmingham & Coast (merged with the Atlantic Coast Line on

January 1), has been appointed division engineer of the Georgia Railroad, with headquarters as before at Atlanta, Ga.

Frederic W. Alexander, assistant chief engineer of the Western region of the Canadian Pacific, at Winnipeg, Man., has retired after nearly 50 years of railway service, and the position of assistant chief engineer, Western region, has been discontinued.

R. D. Claborn, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Savanna, Ill., has been promoted to division engineer of the Dubuque & Illinois division, with the same headquarters, succeeding **Hubert Wuerth,** whose retirement was reported in the November, 1945, issue.

F. R. Goulding, scales inspector on the Central of Georgia, has been promoted to assistant engineer in the office of the chief engineer at Savannah, Ga. **J. C. Yonge** has been appointed assistant engineer at Savannah. **Arthur W. Browning** and **H. M. Garmany,** assistant engineers in the office of the chief engineer, have resigned to engage in business for themselves at Atlanta, Ga., and Savannah, respectively.

Benjamin Chappell, division engineer of the Portage-Brandon division of the Canadian National, at Winnipeg, Man., has been appointed special engineer, with the same headquarters. A photograph and sketch of Mr. Chappell's career were published in the February, 1945, issue. **G. M. Pearston** has been appointed division engineer at Winnipeg, succeeding Mr. Chappell.

G. M. Helmig, division engineer of the Missouri Pacific, at Poplar Bluff, Mo., has been promoted to district engineer, Southern district, with headquarters at Little Rock, Ark., replacing **A. B. Chaney,** who has been granted a leave of absence to serve on a special railway mission in the Republic of Ecuador. **F. R. Woolford** has been appointed division engineer at Poplar Bluff, succeeding Mr. Helmig.

J. C. Nichols, associate bridge engineer of the Louisville & Nashville, at Louisville, Ky., has been promoted to bridge engineer, with the same headquarters, succeeding **Charles Bruce** assigned to other duties because of ill health. **Water Kuersteiner,** assistant bridge engineer at Louisville, has been advanced to associate bridge engineer, replacing Mr. Nichols. **E. P. Benedict,** assistant engineer, succeeds Mr. Kuersteiner as assistant bridge engineer. **Charles Stoecker,** recently released from the armed forces, has been appointed assistant engineer, at Louisville, succeeding **Robert McLaughlin,** assigned to other duties.

C. H. Manning has been appointed assistant division engineer of the Hinton division of the Chesapeake & Ohio, with headquarters at Hinton, W. Va., succeeding **James Edward Hogan,** who died recently. **W. K. Weaver, Jr.,** has been appointed assistant division engineer on the Cincinnati division, with headquarters at Covington, Ky. **Playford W. Shenefield** has been appointed assistant cost engineer at Marion, Ohio, succeeding **Paul R. Matthews,** promoted, and **Robert H. Abbott** has been appointed assistant cost engineer of the Peninsula subdivision at Richmond, Va.

W. S. Broome, engineer maintenance of way of the Colorado & Southern, Ft. Worth & Denver City, and Wichita Valley, at Denver, Colo., has been appointed assistant chief engineer, in charge of engineering and maintenance of way, with the same headquarters, succeeding **M. A. Stainer,** who has retired.

Mr. Stainer was born at Hays, Kan., on April 9, 1893, and after graduation from the University of Kansas in 1904, was employed by various contractors and consulting engineers, chiefly in the vicinity of Kansas City, Mo., until June, 1911, when he was made chief engineer of construction of the Nashville-Gallatin Interurban Railway, at Nashville, Tenn.

M. A. Stainer

Upon the completion of this road he was made general superintendent, and in 1914 he returned to Kansas City for further work with consulting engineers at that point. In October, 1915, he entered the service of the Panhandle & Santa Fe, in the valuation department at Amarillo, Tex., and in September, 1916, he was transferred to the Gulf, Colorado & Santa Fe, at Galveston, Tex. Mr. Stainer was appointed roadmaster at Center, Tex., in July, 1917, and one year later he went with the Fort Worth & Denver City as assistant valuation engineer at Ft. Worth, Tex. In October, 1918, he was promoted to district engineer, and in March, 1920, his title was changed to engineer maintenance of way of the F. W. & D. C. and of the Wichita Valley. In October, 1932, his title was changed to engineer, with headquarters as before at Ft. Worth, Tex. On July 1, 1939, he was advanced to assistant chief engineer at Denver, including the Colorado & Southern, the position he held at the time of his retirement. From August, 1941 to August, 1945, Mr. Stainer was also chief engineer of the Denver Union Terminal.

H. B. Rutherford, supervisor of track on the New York Central, at Corning, N.Y., has been promoted to assistant division engineer of the Eastern division, with headquarters at New York. **C. C. Lathey,** supervisor of track at Jersey Shore, Pa., has been advanced to assistant division engineer of the Syracuse division, with headquarters at Syracuse, N.Y. **Clarence M. Gregg,** supervisor of track at Oneida, N.Y., has been promoted to assistant division engineer of the Mohawk division, with headquarters at Albany, N.Y. **H. W. Lind,** assistant supervisor of track at Buffalo, N.Y., has been appointed assistant engineer, Eastern division, at New York. All of the above positions are newly-created.

C. H. Burks, division engineer of the Carolina division of the Seaboard Air Line, at Savannah, Ga., has been promoted to assistant chief engineer, with headquarters at Norfolk, Va., succeeding **J. W. Smith,** whose promotion to assistant general superintendent is reported elsewhere in these columns. **W. R. Cox,** division engineer of the South Florida division, with headquarters at Tampa, Fla., has been transferred to Savannah, replacing Mr. Burks, and **G. A. Calhoun,** assistant to the division engineer at Jacksonville, Fla., has been advanced to division engineer at Tampa.

James B. Akers, assistant chief engineer of the Southern, at Washington, D.C., has been promoted to chief engineer, succeeding **Bernard Herman,** who has retired after more than 45 years of service. **George L. Sitton,** chief engineer maintenance of way and structures of the Eastern lines, at Charlotte, N.C., has been advanced to assistant chief engineer of the system, at Washington, replacing Mr. Akers, and **Thodore M. von Sprecken,** engineer of bridges of the Western lines, at Cincinnati, Ohio, replaces Mr. Sitton as chief engineer maintenance of way and structures at Charlotte. **E. S. Birkenwald,** assistant engineer of bridges of the Central lines, at Knoxville, Tenn., has been promoted to engineer of bridges of the Western lines, at Cincinnati, succeeding Mr. von Sprecken.

Edward A. Dougherty, whose promotion to chief engineer of the New York Central System, Lines West of Buffalo, including the Indiana Harbor Belt, the Chicago River & Indiana, and the Chicago Junction, with headquarters at Chicago, was reported in the December issue, entered the service of the New York Central as a chainman in the engineering department on June 15 1906, and worked during the summer vacations of 1906-1909 while attending the School of Mines, Columbia University, from which he was graduated as a civil engineer in 1910. From 1910 to 1917 he served in the engineering department in various positions from chainman to assistant engineer, and during this period he worked on the electrification of the New York Central between Mott Haven, N.Y., and Croton-on-Hudson, N.Y., and also on third and fourth tracking at various points. From 1917 to 1919 Mr. Dougherty served in the valuation department as assistant engineer; from 1919 to 1923, as assistant engineer in the office of the corporate chief engineer and assistant to the president; and from 1923 to February 1, 1926, in the office of the assistant vice-president and vice-president of operation. On February 1, 1927, he was appointed designing engineer in the office of the chief engineer of the Lines East of Buffalo, at New York, which position he held until May 1, 1935, when he was appointed assistant chief engineer

there. In 1938 he was promoted to assistant to the vice-president, at Chicago, and on April 1, 1943, he was advanced to assistant general manager, Lines West of Buffalo, with headquarters at Cleveland, Ohio, the position he held at the time of his new appointment.

Track

J. H. Royea, roadmaster on the Canadian Pacific at Newport, Vt., has retired from active service.

H. B. Orr, assistant supervisor of track on the Chesapeake & Ohio, at Chillicothe, Ohio, has been promoted to supervisor at Pikeville, Ky.

J. D. Sauve, roadmaster on the Canadian National at Ottawa, Ont., has been transferred to Lindsay, Ont., succeeding **R. Hope,** who has retired from active service.

H. J. Gagnon has been appointed roadmaster on the Quebec Central, a subsidiary of the Canadian Pacific, at Vallee Jct., Que., succeeding **A. Pomerlau,** whose retirement was reported in the December issue.

J. T. Peabody, who has been on leave of absence to serve in the armed forces, has been appointed roadmaster on the Chicago & North Western, at Antigo, Wis., succeeding **L. J. Simons,** assigned to other duties.

Charles S. Bray, general foreman on the Erie at Hornell, N.Y., has been promoted to track supervisor at that point, succeeding **Paul J. Seidel,** whose appointment as inspector of operation is reported elsewhere in these columns.

Charles E. Neal, roadmaster on the Southern Pacific, at Dunsmuir, Cal., has been promoted to general track supervisor, at San Francisco, Cal., succeeding **William F. Monahan,** whose retirement was reported in the January issue.

Marvin R. Tanner, rail welder on the Central of Georgia, has been promoted to supervisor of track, with headquarters at Macon, Ga., succeeding **Walter Burke,** who has been transferred to Savannah, Ga. Mr. Burke relieves **G. W. Burney,** who has retired from active service.

Herbert J. Lieser, a welder on the Belt Railway of Chicago, has been promoted to track supervisor at Clearing, Ill., succeeding **Leslie Day,** whose appoinoment as assistant engineer on the Chicago & Western Indiana is reported elsewhere in this issue.

Walter Vincent Clements, chief clerk to the vice-president of the Macon, Dublin & Savannah, has been promoted to supervisor of track and structures, succeeding **R. G. Weaver,** who has resigned. Mr. Clements was born at Lizella, Ga., on April 16, 1909, and entered the service of the Macon, Dublin & Savannah on January 16, 1926, as a bridge carpenter, subsequently serving as apprentice bridge foreman, bridge foreman, storekeeper, chief clerk to the supervisor of track and structures, and chief clerk to the vice-president.

Wayne Smith, who is returning from military duty where he rose to the rank of Lt. Colonel, has resumed his former position of supervisor of track on the Illinois Central, at Mattoon, Ill., succeeding **J. F. Brosnahan,** who has been transferred to Gilman, Ill., replacing **A. L. Sams,** promoted.

M. V. Holmes, who has been on furlough to serve in the armed forces, has been appointed roadmaster on the Eastern lines of the Atchison, Topeka & Santa Fe, at Ottawa, Kan., succeeding **J. Urlacher,** who has been transferred to Topeka, Kan., replacing **R. S. Ward,** assigned to other duties.

G. C. Cleveland, roadmaster on the Panhandle & Santa Fe (part of the Santa Fe system), at San Angelo, Tex., has been appointed roadmaster of the Panhandle division of the Atchison, Topeka & Santa Fe, at Harper, Kan., succeeding **B. R. Pulliam,** whose death is reported elsewhere in these columns.

H. W. Moore has been appointed roadmaster on the Atlantic Coast Line, at Trilby, Fla., succeeding **T. M. Woodburn,** who has been assigned to other duties because of ill health. **W. D. Hart,** acting roadmaster, has been promoted to roadmaster at Troy, Ala., succeeding **C. E. Vick,** who has been transferred to Sanford, Fla.

J. W. Shurtliff, who has been on leave of absence to serve in the armed forces, has been appointed roadmaster on the Chicago, Rock Island & Pacific, at Chickasha, Okla., succeeding **C. J. Gardner,** whose death is reported elsewhere in these columns. **R. P. Scott,** acting roadmaster at Chickasha, has been promoted to roadmaster at Oklahoma City, Okla., a new position.

L. W. Howard, assistant supervisor of track on the Louisiana division of the Illinois Central, with headquarters at McComb, Miss., has been promoted to supervisor of track on the Mississippi division, with headquarters at Grenada, Miss., to succeed **Norman W. Kopp,** who has been assigned to special work, with headquarters at Chicago.

R. B. Wallace, assistant cost engineer on the Chesapeake & Ohio, has been appointed assistant supervisor of track of the Allegheny subdivision at Ronceverte, W. Va. **W. K. Putney** has been appointed assistant supervisor of track of the Mountain subdivision at Clifton Forge, Va. **E. S. Stanley** has been appointed assistant supervisor of track of the Piedmont subdivision at Gordonsville, Va.

H. W. Wolcott, acting roadmaster on the Chicago, Burlington & Quincy, at Edgemont, S.D., has been promoted to roadmaster at that point, succeeding **J. T. Gilmore,** who has retired. **M. G. Counter,** roadmaster at McCook, Neb., has been transferred to Lincoln, Neb., replacing **E. B. Raichart,** who has also retired. **M. Irelan** has been appointed roadmaster at Oxford, Neb., relieving **L. E. Baken,** who has been assigned to other duties.

O. Gosselein, roadmaster on the Canadian Pacific, at Sherbrooke, Que., has been transferred to Newport, Vt., succeeding **J. H. Royea,** who has retired. **N. J. Demers,** roadmaster on the Quebec Central, a subsidiary of the Canadian Pacific, at Sherbrooke, has been named roadmaster of the C. P. at Sherbrooke, replacing Mr. Gosselein. **N. Walsh** has been appointed roadmaster on the Q.C. with headquarters at Sherbrooke, succeeding Mr. Demers.

A. Krausman, whose promotion to roadmaster on the Chicago, Great Western, at Dubuque, Iowa, was reported in the January issue, was born at Melbourne, Iowa, on August 24, 1904, and was educated in the high schools of that city. He entered railway service in February, 1924, as a section laborer on the C. G. W., advancing to section foreman at Reinbeck, Iowa, on June 30, 1927. Four years later he was advanced to yard foreman at Waterloo, Iowa, and in June, 1944, he was promoted to general track foreman at Oelwein, Iowa, serving in this capacity until his recent promotion.

C. F. Grigg, Jr., former assistant supervisor of track on the Maryland division of the Pennsylvania, who recently returned from military service, has been appointed supervisor of track on the Cleveland division. **H. P. Morgan,** former assistant supervisor of track on the Maryland division and recently returned from military service, has been appointed supervisor of track on the Monongahela division. **W. L. Turner,** formerly assistant supervisor of track on the Williamsport division and also recently returned from military service, has been appointed assistant supervisor of track on the Eastern division (Central region). **G. H. J. Siebert,** a bridge and building apprentice on the Maryland division, has been promoted to assistant supervisor of track at Nothumberland, Pa.

E. S. Hughes, roadmaster on the Pocahontas division of the Norfolk & Western, at Wilcoe, W. Va., has been transferred to the Norfolk division at Crewe, Va., succeeding **O. H. Tolley,** who retired on January 1. **R. Y. Cooke,** inspector in the office of the manager of roadway maintenance, has been advanced to assistant roadmaster at Sardinia, Ohio, succeeding **W. O. Smith, Jr.,** who has been promoted to roadmaster at Wilcoe, W. Va., relieving Mr. Hughes. **W. O. Tracy, Jr.,** former assistant roadmaster, has returned from military service and has been appointed assistant roadmaster on the Scioto division with headquarters at Portsmouth, Ohio.

Mr. Smith entered railway service in 1934 as a general storehouse employee on the Norfolk & Western, and since then has served as timekeeper and assistant foreman at the roadway material yard and assistant roadmaster on the Radford, Shenandoah and Scioto divisions.

G. D. Graham, acting roadmaster on the Chicago, Burlington & Quincy, at Creston, Iowa, has been promoted to roadmaster, at Red Oak, Iowa, succeeding **A. C. Anderson,** who has retired. **V. V. VanVelkinburgh,** acting roadmaster at Kansas City, Mo., has been advanced to

roadmaster, at Creston, Iowa, replacing Mr. Graham. **W. R. Garrett,** roadmaster at Hannibal, Mo., has been transferred to St. Joseph, Mo., and has been assigned supervision over that part of the territory north of Kansas City, previously supervised by Mr. VanVelkinburgh. **T. L. Kanan,** assistant roadmaster, at Hannibal, has been advanced to roadmaster and assistant master carpenter at Kansas City, a new position, and including the remainder of the territory previously under the jurisdiction of Mr. VanVelkinburgh. **J. L. Mason,** roadmaster at Centralia, Ill., has been transferred to Hannibal, Mo., relieving Mr. Garrett. **W. T. Iverson,** roadmaster of the Davenport, Rock Island & Northwestern (a joint subsidiary of the Burlington and the Chicago, Milwaukee, St. Paul & Pacific), at Davenport, Iowa, has been appointed roadmaster on the Burlington, succeeding Mr. Mason.

William A. Underwood, whose retirement as superintendent maintenance of way of the Chicago, South Shore & South Bend, at Michigan City, Ind., was reported in the January issue, was born in Chicago on November 11, 1877, and received his higher education at the Armour Institute in that city. He entered railway service in 1899, in the maintenance of way department of the Chicago City Railroad, serving that line until 1903, when he entered the employ of the Wheeling Traction, Wheeling, W. Va., in the maintenance department. From 1913 to 1916, in addition to his duties with the Wheeling Traction, he served the West Penn Railways as a construction engineer in the Wheeling district. Mr. Underwood resigned from the Wheeling Traction in 1920 to become an engineer with a meat packing company, and in 1922 he went with the Chicago, Lake Shore & South Bend (now Chicago, South Shore & South Bend) as electrical engineer. In 1924 he was advanced to engineer maintenance of way, and in 1926 he was appointed superintendent of way and structures. Mr. Underwood was made superintendent maintenance of way in 1932, holding this position until his retirement.

E. T. Delaney, assistant supervisor of track on the New York Central at Syracuse, N.Y.; has been promoted to supervisor of track of subdivision 24, Pennsylvania division, with headquarters at Corning, N.Y., succeeding **H. B. Rutherford,** whose promotion to assistant division engineer at New York is reported elsewhere in these columns. **J. V. Middleton,** assistant division engineer, Eastern division, at New York, has been appointed supervisor of track, subdivision 26, Pennsylvania division, with headquarters at Jersey Shore, Pa., relieving **C. C. Lathey,** whose promotion to assistant division engineer at Syracuse, N.Y., is reported elsewhere in these columns. **W. DeVries,** supervisor of track of subdivision 18, St. Lawrence division at Gouverneur, N.Y., has been transferred to subdivision 8, Mohawk division, at Oneida, N.Y., replacing **Clarence M. Gregg,** whose promotion to assistant division engineer at Albany, N.Y., is reported elsewhere in these columns, and **G. S. Wooding,** assistant supervisor of track at Lyons, N.Y., has been advanced to supervisor of track at Gouverneur, succeeding Mr. DeVries. **Cornelius Donnelly,** assistant supervisor of track at Hudson, N.Y., has been promoted to supervisor of track, subdivision 31, St. Lawrence division, at Remsen, N.Y., relieving **Frank L. Vault, Jr.,** who has been transferred to subdivision 21, River division at Kingston, N.Y., replacing **L. Phelps,** who retired from active service on December 31.

W. F. Potts, a track foreman on the Pennsylvania division, has been advanced to assistant supervisor of track at Buffalo, N.Y., succeeding **H. W. Lind,** whose appointment as assistant engineer on the Eastern division at New York is reported elsewhere in these columns. **J. E. Egan,** who has recently returned from military service and was formerly a track foreman on the New York Central, has been appointed assistant supervisor of track at Syracuse, relieving Mr. Delaney. **T. M. Kohlman,** assistant supervisor of track on the River division at Newburgh, N.Y., has been transferred to the Syracuse division at Lyons, replacing Mr. Wooding, and **Alexander Matthews, Jr.,** who recently returned from military service, has been appointed assistant supervisor of track at Newburgh, succeeding Mr. Kohlman. **Charles A. Ford,** a track foreman, has been promoted to assistant supervisor of track at Brewster, N.Y., succeeding **John J. Cox,** who has been transferred to Hudson, N.Y., relieving Mr. Donnelly. **Paul W. Reid,** a track foreman on the Pennsylvania division, has been advanced to assistant supervisor of track on subdivision 28 of the Electric division at New York, replacing **R. A. Bussing,** who has been assigned to other duties.

R. Wyatt Webb, whose promotion to roadmaster on the Canadian Pacific, with headquarters at Ottawa, Ont., was reported in the November issue, was born at Sutton, Que., on November 11, 1915, and attended Bishops College School and Sir George Williams College. He entered railway service on June 15, 1936, as an extra-gang laborer on the Farnham division of the Canadian Pacific, and in 1939 was appointed a rodman in the engineering department, serving in that capacity on both the Farnham and Laurentian divisions until 1942. In the latter year, Mr. Webb was advanced to transitman on the Farnham division, later being transferred to the Smith Falls division, and in 1944 he was appointed relieving roadmaster on the Smith Falls division, which position he held until his recent promotion.

Bridge and Building

R. D. Turnbull, bridge and building master on the Canadian Pacific, at Lethbridge, Alta., has been transferred to Edmonton, Alta., succeeding **R. Tourner,** who in turn has been transferred to Lethbridge, replacing Mr. Turnbull.

Herbert T. Bishop, asistant supervisor of bridges and buildings on the Chesapeake & Ohio at Richmond, Va., has been promoted to supervisor of bridges and buildings, with the same headquarters, succeeding **C. L. Marks,** whose death on November 17 was reported in the January issue. **Harry M. Saunders,** carpenter foreman, has been advanced to assistant supervisor of bridges and buildings at Richmond, relieving Mr. Bishop.

Special

S. E. Tracy, who has been on leave of absence to serve in the armed forces, has been appointed superintendent of work equipment of the Chicago, Burlington & Quincy, at Chicago.

R. L. Waldrop, assistant scales inspector on the Central of Georgia, has been promoted to scales inspector, succeeding **F. R. Goulding,** whose appointment as assistant engineer at Savannah, Ga., is reported elsewhere in these columns.

Obituary

E. J. Graney, supervisor of track on the New York Central, at Lyons, N.Y., died suddenly at his home on January 6.

B. R. Pulliam, roadmaster on the Panhandle division of the Atchison, Topeka & Santa Fe, died recently.

Phillips Bathhurst Motley, who retired in 1937 as engineer of bridges of the Canadian Pacific, died at Montreal, Que., on January 13. Mr. Motley was a life member of the American Railway Engineering Association.

Word was recently received that **Albert H. Dakin,** a life member of the American Railway Engineering Association, who retired in 1935 as assistant engineer on the Central Railroad of New Jersey, died on March 15, 1945.

Anthony Francis Sommer, vice-president and general manager of the Quanah, Acme & Pacific, at Quanah, Tex., died on December 8. Mr. Sommer was born at Galveston, Tex., on January 6, 1887, and was a graduate of Purdue University. Upon completion of his education, he entered the employ of the Q. A. & P. as a draftsman, in 1910, advancing to resident engineer in 1914. In 1918 Mr. Sommers was made vice-president and general manager, holding this position continuously from that time until his death.

Roy G. Bush, division engineer on the Missouri Pacific, whose recent death at Coffeyville, Kan., was reported in the December issue, entered the employ of the Missouri Pacific in 1916, as an assistant division engineer. In 1925 he was advanced to division engineer at Hoisington, Kan., and the following year he was transferred to Kansas City, Mo. From 1930 to 1933 he served as division engineer at Falls City, Neb., being appointed assistant engineer on special work during the latter year. Later that same year he was named division engineer at Coffeyville, the position he held until his recent death.

Otto Gersbach, retired chief engineer of the Indiana Harbor Belt, the Chicago River & Indiana and the Chicago Junction, whose death on October 30, was reported in the December issue, was born at Montezuma on August 24, 1876, and was graduated from Iowa State College in 1897. He entered railway service in the

(Continued on page 190)

QUICK QUIZ

FOR

Efficiency-Minded Engineers

1 *What steel foundation pile is noted for its exclusive FLUTED, TAPERED design that makes driving with average job equipment possible and profitable?*

2 *What steel foundation pile has a special EXTENDIBLE feature permitting quick and simple field extensions with either uniform or tapered sections?*

3 *What steel foundation pile combines these two cost-cutting, labor-saving benefits with a HOLLOW, TUBULAR construction that makes top-to-toe inspection quick and thorough?*

THE RIGHT ANSWER

Monotubes... enthusiastically favored by job experienced engineers and contractors for cast-in-place foundations for buildings, bridges, airports, highways and marine construction. Available in gauge, size and taper to meet requirements of varying soil conditions. For catalog or engineering aid, write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Tapered Piles

same year with the Iowa Central (now the Minneapolis & St. Louis), and in 1902 he went with the Indiana Harbor (now the Indiana Harbor Belt), in charge of track elevation. In 1907 Mr. Gersbach went with the Indiana & Southern (now part of the New York Central), on the construction of bridges on the Kankakee division, with headquarters at Chicago, and three years later he became engineer maintenance of way of the Indiana Harbor Belt. In 1918 he was promoted to chief engineer, with headquarters at Gibson, Ind., and in 1922 he was also appointed chief engineer of the Chicago Junction and the Chicago River & Indiana, with headquarters at Chicago. From February, 1933, to November, 1937, Mr. Gersbach served also as chief engineer of the western division of the New York Central, and the west division of the Michigan Central.

Ralph C. Miller, comptroller of the Pennsylvania, at Philadelphia, Pa., died on December 11. Mr. Miller was born at

Ralph C. Miller

Zanesville, Ohio, on December 11, 1878, and received the degree of Civil Engineer from Ohio State University in 1901. Upon completion of his education he entered the employ of the Pennsylvania as an assistant on the engineering corps. In 1906 he was promoted to assistant division engineer, serving successively at Marietta, Ohio, Logansport, Ind., and Columbus, Ohio. He was advanced to division engineer at Toledo, Ohio, in 1912, later being transferred to Terre Haute, Ind., Chicago, Philadelphia, and New York. In 1926 he was further advanced to superintendent at Philadelphia, Pa., serving at that point and at Toledo and Columbus, until 1930, when he was promoted to acting assistant chief engineer, at Philadelphia. In 1931 Mr. Miller returned to the operating department as general superintendent at Indianapolis, Ind., subsequently being transferred to Pittsburgh, Pa. He was promoted to assistant chief engineer, at Philadelphia, in 1940, and in 1943 he was further advanced to comptroller there.

Airco Welding Accessories—The Air Reduction Sales Company, New York, has published a 16-page booklet which describes its line of Airco gas welding and cutting supplies and accessories.

Association News

American Railway Engineering Association

With preparations under way for the convention to be held at the Palmer House, Chicago, on March 12-14, most of the committees have completed their work for the year, with only one meeting having been held in January and none scheduled for February. The meeting in January was held by the Committee on Economics of Railway Location and Operation, which met at Cincinnati, Ohio, on January 23.

Bulletin 457 was mailed to members on January 28. This bulletin contains the reports of the Committees on Wood Bridges and Trestles, Masonry, Records and Accounts, Iron and Steel Structures, Waterproofing, Impact and Bridge Stresses, and Co-Operative Relations with Universities. It also contains a reprint of the report on electrolysis of concrete prepared by a committee of the Electrical Section.

Bulletin 458, containing the reports of the Committees on Roadway and Ballast, Rail and Track, will be mailed about February 15. It is expected that the Year Book will become available about March 1, in time for distribution to the members before the convention.

Roadmasters' Association

It is still not possible to publish a complete list of the personnel of association technical committees for the current year, although some of the committees are complete and are already at work on their assignments. It is expected that a full list of members making up these committees, including the chairmen and vice-chairmen, can be reported in the March issue.

During the last few months there have been several changes affecting the officers and directors of the association, including the death of A. L. Kleine, a director, and trainmaster on the Denver & Rio Grande Western, on October 11, 1945, as reported in the November issue, 1945; the resignation of second vice-president F. J. Meyer as chief engineer of the New York, Ontario & Western, to become chief engineer of a railway supply company, as reported in the personal mention columns of this issue; and the leave of absence granted A. B. Chaney, a director, and district engineer, Missouri Pacific, to serve on a special railway mission being sent to the republic of Ecuador, likewise reported in this issue.

At its last meeting, the Executive committee elected Neal D. Howard, editor, *Railway Engineering and Maintenance*, a director to fill the unexpired term of Mr. Kleine.

Maintenance of Way Club of Chicago

Meeting in the Ambassador Room of Huyler's Restaurant, Chicago, 186 members and guests were in attendance at the meeting of the club held on January 28, which was addressed by L. W. Horning, vice-president, personnel and public relations, New York Central System, who spoke on The Supervisor's Responsibility In Public Relations.

Dividing his remarks into two primary parts, Mr. Horning first discussed why and how railway men should get along among themselves, and second, why and how they should get along with the railways' customers. As regards the former, he said: "The responsibility for building morale among employees rests squarely upon the shoulders of the supervisor—more so than upon anyone else." In the latter regard he pointed out that few maintenance of way men have an opportunity to talk with customers, but emphasized that, "Much of the customers' satisfaction with our service will be the result of the work of men in the maintenance of way department."

At its next meeting, to be held on the evening of February 25, the club will entertain a representative number of the large group of Chinese Nationals who are undertaking training courses on the various roads of the United States, and will be addressed by at least three of these guests upon the scope of their studies in the United States; their observations of American railroad practices and methods; and the current railway situation in the Republic of China.

Bridge & Building Association

January has seen a sharp upswing in the activities of the association under the direction of its officers and directors, looking to building the organization back to its prewar strength and vitality, and a drive for new members and associate members, to be continued throughout the year, is already showing favorable results, with 21 applications for membership having been received during the last month.

All eight technical committees for the year have been appointed and are already at work, looking to the completion of their reports by June 15 for review by the Executive committee about that time. The subjects being considered by the various committees, together with the chairman and vice-chairmen of each committee are as follows:

No. 1—Cause and Prevention of Personal Injuries to Bridge and Building Employees—H. D. Curie (chairman), mast. carp., B.&O., Garrett, Ind.; E. H. Blewer (vice-chairman), supv. safety engr., N.Y.C., New York, N.Y.; A. C. Jones (vice-chairman), b.&b. supvr., Southern, Parrish, Ala.; T. D. Osbourne (vice-chairman), asst. b.&b. supvr., S.P., Los Angeles, Cal.

No. 2—Tools and Equipment for Bridge and Building Shops—H. E. Davis (chairman), supv. b.&b., N.Y.C., Chicago; P. B. Collier (vice-chairman), b.&b. supvr., M.P., St. Louis, Mo.; P. F. McNally, Sr. (vice-chairman), asst. b.&b. supvr., S.P., Ogden, Utah; H. E. Skinner (vice-chairman), br. insp., E.J.&E., Joliet, Ill.

No. 3—Methods of Cleaning Water Lines, Sewers and Drains—W. D. Gibson (chairman), asst. engr., C.B.&Q., Chicago; J. P. Hanley (vice-chairman), w.s. insp., I.C., Chicago; V. V. Holmberg (vice-chairman), supvr. b.&b., C.&W.I., Chicago; K. J. Weir (vice-chairman), supvr. fuel & w.s., C.M.St. P.&P., Chicago.

No. 4—Adapting Turntables to Meet Modern Conditions—H. M. Harlow (chairman), asst. gen. supvr. b.&b., C.&O., Richmond, Va.; A. E. Bechtelheimer (vice-chairman), engr. of br., C.&N.W., Chicago; F. H. Cramer (vice-chairman), br. engr., C.B.&Q., Chicago; Lee Mayfield (vice-chairman), asst. engr. str., M.P., Houston, Tex.

No. 5—Servicing Facilities for Diesel Locomotives—B. R. Meyers (chairman), off. engr., C.&N.W., Chicago; L. P. Kimball (vice-chairman), engr. bldgs., B.&O., Baltimore, Md.; A. D. Reed (vice-chairman), mast. carp., C.B.&Q., McCook, Neb.

(Continued on page 192)

SCHRAMM TAMPAIR

A COMPACT, EFFICIENT 4-TAMPER COMPRESSOR

For both spot and out-of-face tamping, many maintenance-of-way supervisors prefer six to ten men crews and four-tamper compressors rather than larger units. If this is your practice, consider the Tampair or any of the other Schramm Fordair compressors.

The Tampair is compact — no larger than your desk (59 x 32 inches) and only 45 inches high. It delivers 60 cubic feet actual air per minute at 80 to 100 pounds pressure. Both motor and compressor are four cylinder; both are liquid cooled by the same radiator and pump.

Another important advantage is ease and availability of service. Since both motor and compressor are built from a Ford-Mercury engine block, 90 per cent of the wearing parts are quickly procurable from any authorized Ford dealer.

Man power alone can easily shift or position the Tampair along ground or rail or load it on a dolly. It may also be towed on the highway.

Get the Tampair facts today. To see one is to be sold.

Ask for the *NEW* Schramm Catalog

Forty-four pages illustrating and describing Schramm models for every purpose. Schramm, Inc., "The Compressor People," West Chester, Penna.

How DURA-TRED Meets Every Railroad Flooring Need

Dura-Tred provides a tough, durable, high-traction flooring.

It is used extensively by leading railroads for patching or covering passenger, warehouse, loading and storage platforms, ramps, steps and terminal areas.

Compare these advantages of using Dura-Tred:

- It stands up under exposure to weather
- It improves under heavy truck-train use
- It is highly resistant to anti-freeze agents
- During installation it holds interference with traffic to the minimum

Mail the coupon today for free literature on Dura-Tred Flooring for Railroads.

TIME-TESTED BY LEADING RAILROADS

DURA-TRED COMPANY

355 N. Central Park Blvd., Chicago 24, Ill.

MAIL COUPON NOW!

Dura-Tred Company
355 N. Central Park Blvd.
Chicago 24, Ill.

Please send me more details about Dura-Tred Flooring for railroad use—and about your special offer.

Name.....

Company.....

Address.....

City.....Zone.....

State.....

No. 6—Methods of Improving Strength, Durability and Wear Resistance of Concrete—J. S. Hancock (chairman), br., engr., D.T.&I., Dearborn, Mich.; A. B. Chapman (vice-chairman), br. engr., C.M.St. P.&P., Chicago; R. W. Gilmore (vice-chairman), gen. br. insp., B.&O., Cincinnati, Ohio; Franz M. Misch (vice-chairman), gen. b.&b. supvr., S.P., San Francisco, Cal.

No. 7—Utility and Economy of Pre-Fabricated Buildings—A. G. Dorland (chairman), asst. engr., E.J.&E., Joliet, Ill.; W. A. Huckstep (vice-chairman), gen. b. supvr., M.P., St. Louis, Mo.; L. E. Peyser (vice-chairman), prin. asst. arch., S.P., San Francisco, Cal.

No. 8—Developments in the Use of Off-Track Work Equipment—F. R. Spofford (chairman), asst. div. engr., B.&M., Dover, N.H.; W. F. Martens (vice-chairman), gen. fore. b.&b. and w.s., A.T.&S.F., San Bernardino, Cal.; C. E. Russell (vice-chairman), supvr. w.s., I.C., Chicago; John D. Trulove (vice-chairman), gen. b.&b. fore., S.P., Sparks, Nev.

Supply Trade News

General

Bowser, Inc., Ft. Wayne, Ind., has acacquired the complete inventory of parts and finished units, and the exclusive manufacturing rights of Torrington Labricators from the **Torrinton Manufacturing Company,** Torrington, Conn.

The name of the Hi-Way Service Corporation, manufacturers of the Drott line of earth-moving equipment, has been changed to the **Drott Manufacturing Corporation.** Offices of the company will continue to be located at 5141 North 35th Street, Milwaukee 9, Wis.

The General Supply & Equipment Co., Baltimore, Md., has been appointed exclusive distributor and service agency for **R. G. LeTourneau, Inc.,** handling sales and service of the LeTourneau line of earth-moving equipment to six railroads maintaining general offices in that territory.

The **Koppers Company, Inc.,** Pittsburgh, Pa., has acquired control of the **Wailes-Dove-Hermiston Corporation,** Westfield, N.J., manufacturer and contractor of bituminous coatings for the protection of iron and steel against corrosion. The Wailes-Dove-Hermiston Corporation will continue to operate as a separate organization without change in its present management.

Personal

James C. Barnaby, consulting engineer of the **Worthington Pump and Machinery Corp.,** Harrison, N.J., has been appointed assistant director of research and development.

A. L. Fridley, assistant chief clerk to the chief engineer of the Chicago, Burlington & Quincy, has been appointed field representative of **Hubbard & Co.,** with headquarters at 332 S. Michigan, Ave., Chicago 4.

Alfred C. Laessig, western representative of **Hubbard & Co.,** at Chicago, has been promoted to general manager, and **J. Louis Wenzel** has been appointed assistant general manager, of the tool department, with headquarters at Pittsburgh, Pa. A photograph and a biographical sketch of Mr. Laessig were published in the July, 1945, issue. **N. A. Howell,** western sales representative of the **Unit Rail Anchor Company,** an affiliate of Hubbard & Co., at Chicago, has been appointed also western sales representative of Hubbard & Co., succeeding Mr. Laessig.

Bruce A. Royer has joined the general sales staff of the **Caterpillar Tractor Company** and has been temporarily assigned to the Sales Training division. He was formerly field engineer and director of market research of R. G. LeTourneau, Inc.

Charles N. Karr has been appointed sales promotion manager of the **Allis-Chalmers Manufacturing Company,** Milwaukee, Wis., succeeding **E. L. Aikins,**

Charles N. Karr

who has been placed in charge of the company's tractor division office in Seattle, Wash. Mr. Karr has been a member of the sales staff of Allis-Chalmers since 1919, later being in charge of branch offices in Bloomington, Ill., and Peoria.

Frank J. Meyer, chief engineer of the New York, Ontario & Western, at Middletown, N. Y., has resigned that position to become chief engineer of the railway division of the **Philadelphia Steel & Wire Corp.,** Philadelphia 44, Pa.

H. G. Sharp, assistant general manager of the General Machinery Ordnance Corporation, has been appointed general manager of the **Graver Tank & Manufacturing Co., Inc.,** East Chicago, Ind., and **William G. Shipman** has been named plant superintendent.

Eugene T. Scott, who has just been released from the United States Naval Air Forces, has been appointed product application engineer of **Templeton, Kenly & Co.,** with headquarters at Chicago. Prior to entering the Navy, Mr. Scott was employed in personnel work by the Chicago Screw Company.

The **LeRoi Company,** Milwaukee, Wis., has announced the following appointments: **Stanley H. Smith,** 1810 Republic building, Cleveland, Ohio, eastern railroad sales agent; **R. E. Bell,** 962 Paul Brown building, St. Louis, Mo., southwestern railroad sales agent; and **Lloyd**

(Continued on page 194)

- Builders of standard and special trackwork for Railroads since 1882—Weir Kilby again steps forward—and offers to its customers the WEIR *New Improved* HEAT-TREATED RAIL CROSSING.
- The need for better Railroad Crossings to meet severe traffic demands has stimulated our efforts to improve the fabricating methods involved in HEAT-TREATED constructions. Our heat-treating is done by one of the largest, best equipped, and most capable heat-treating companies in the country. Our rails are Heat-Treated in their entirety (Head, Web and Base) after all bending and machining have been done. There is no need of disturbing any portion of the rail, after Heat-Treatment, to permit adjustments necessary in assembly.
- For most conditions Heat-Treated constructions will be found lower in first cost, more economical to maintain than other heavy duty constructions. Some Railroads have adopted them to the virtual exclusion of other types.
- Try the *New* WEIR KILBY HEAT-TREATED CROSSING for your next requirement—where the going is toughest.

CATALOG "H"

Comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Standard and Special Track Work for Steam Railroads Since 1882

WEIR KILBY CORPORATION

CINCINNATI 12, OHIO — *Successors to* — **BIRMINGHAM 7, ALA.**

WEIR FROG CO. . . . KILBY FROG & SWITCH CO. . . . CINCINNATI FROG & SWITCH CO.

JORDAN

SPREADER-DITCHER-SNOW PLOW

Working its way through the last of the winter snowdrifts, the JORDAN Multiple-purpose Machine is ready at a few hours' notice to quit the snow plow role and start right in on the spring roadbed maintenance work.

The JORDAN Spreader-Ditcher-Snow Plow is a versatile, year round track maintenance worker.

Send for this NEW book just off the press—

Does the Work of An Army of Men, and Does It Better!

O. F. JORDAN COMPANY EAST CHICAGO INDIANA

Walter J. Riley, *President*

O. Stratton, U.S. National Bank building, Denver, Colo., western railroad sales agent.

Robert Cryor, general manager of the Cicero, Ill., plant of the **Union Asbestos and Rubber Company,** has resumed his duties after an extensive survey of 16 asbestos plants of the German asbestos textile industry, as a representative of the Technical Industrial Intelligence Committee of the Allied Command's Joint Chiefs of Staff.

Roy L. Chitwood, general superintendent of Production of the **T. J. Moss Tie Company,** has been elected a vice-president, succeeding **W. W. Davis,** whose death on January 1 is reported elsewhere in these columns.

A. J. Reading, formerly with the **Elastic Rail Spike Corporation,** has joined the Railroad division of the **Chipman Chemical Company.** Both of these concerns are subsidiaries of **Bernuth, Lembcke Company.**

Norman A. Meserve, superintendent of the Gainesville, Fla., plant of the **American Lumber & Treating Co.,** has been appointed district superintendent, Southeastern district, with headquarters at Florence, S.C. In his new position Mr. Meserve will retain supervision over the Gainesville plant, and in addition will have jurisdiction over a new plant now being built at Florence.

Dr. George V. Slottman has been appointed head of a new technical sales division organized by the **Air Reduction Company,** New York, to replace its former applied engineering department. **S. D. Baumer** and **E. V. David,** who have been assistant managers of the applied engineering department, have been appointed assistant managers in the sales division.

L. M. Cassidy, vice-president of Johns-Manville Sales Corporation, has been elected vice-president in charge of sales of **Johns-Manville Corporation. T. K. Mial,** a vice-president of the sales corporation in charge of the Power Products and Industrial department, has also been elected vice-president of Johns-Manville Corporation. Both men will maintain headquarters in New York. **L. R. Hoff,** vice-president in charge of sales of Johns-Manville Corporation, has retired, after 45 years of service, but will remain in a consulting capacity.

Mr. Cassidy was born at Newark, N.J., and was graduated from the Wharton School of Finance and Commerce of the University of Pennsylvania in 1926, entering the employ of Johns-Manville in that year, as an architectural representative. He was promoted to general merchandise manager in 1936, and in 1940 he was elected vice-president of the sales corporation.

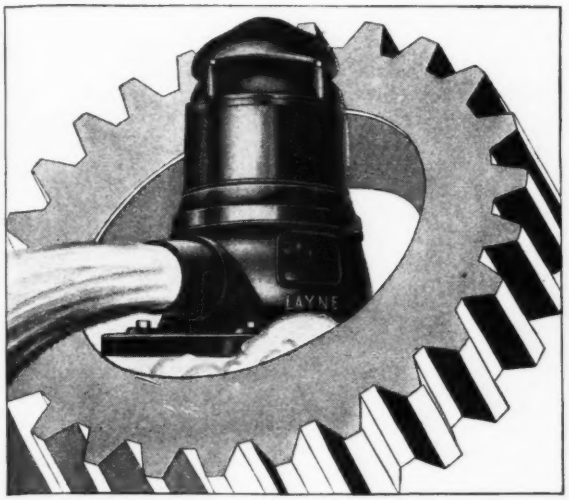
Mr. Mial was born at Raleigh, N.C., and is a graduate of North Carolina State College. He entered the service of Johns-Manville in 1917, as a salesman at Pittsburgh, Pa., becoming manager of the company's Pittsburgh branch five years later. Subsequently he was promoted to division manager at Cleveland, Ohio, and in 1929 he was transferred to New York in the same capacity. In 1931 he was elected a vice-president of the sales corporation, and in 1932 he also became general manager of the Power Products and Industrial division.

Obituary

W. W. Davis, vice-president of the T. J. Moss Tie Company, died at Cape Girardeau, Mo., on January 1.

Dirtmoving.—R. G. LeTourneau, Inc., Peoria, Ill., has published a 12-page folder which compares the advantages of LeTourneau earthmoving equipment with other earthmoving machines, and describes several job-operating techniques. The folder is well illustrated and shows many applications of LeTourneau equipment to railroad work and similar jobs.

Diesel Tractor—The Caterpillar Tractor Company, Peoria, Ill., has published an attractive 32-page catalog, Form 9106, which describes in detail its Model D6 Diesel tractor. The catalog points out and illustrates the important design and construction features of the tractor, and lists its specifications and the available line of matched equipment.



The Biggest Industries

PREFER LAYNE WATER SYSTEMS

The modern industrial plant engineer is quick to show his preference for a Layne Water System. He knows—usually from first hand experience—that Layne Water Systems have many outstanding points of superiority. He knows that they produce the most water—at the lowest cost—and continue to give peak performance for years after other systems have failed.

Layne Water Systems can be bought for any capacity needed, from a few thousand to millions of gallons of water daily. But regardless of size, each will have the same high ratio of efficiency and the same long years of life. Furthermore, Layne engineers often obtain and produce more than an adequate supply of water in locations where others have failed.

Layne offers industrial plants the benefit of their long years of experience in planning water systems. An experienced engineer is available to study your problems and make recommendations—without obligation. For late literature, address Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

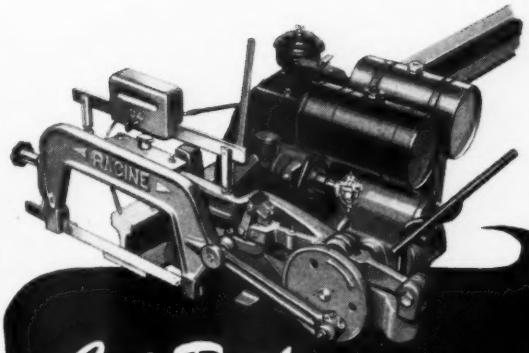
HIGHEST EFFICIENCY

Layne Vertical Turbine Pumps are now available in sizes to produce from 40 to 16,000 gallons of water per minute. Their high efficiency saves hundreds of dollars on power cost per year.

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minn. * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS



Cut Rail . . .
RIGHT ON THE TRACK
with . . .

RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

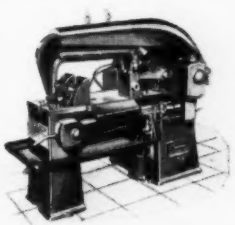
Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
5. Removing split, worn and battered rail ends.
6. Cutting out sections of wheel burned rails and fissures.

Models are available with gas engines, compressed air or electric motors. Write for complete catalog No. 58A. Address RACINE TOOL AND MACHINE CO., 1738 State St., Racine, Wisconsin.

RACINE HEAVY DUTY METAL SAWS FOR RAILROAD SHOPS

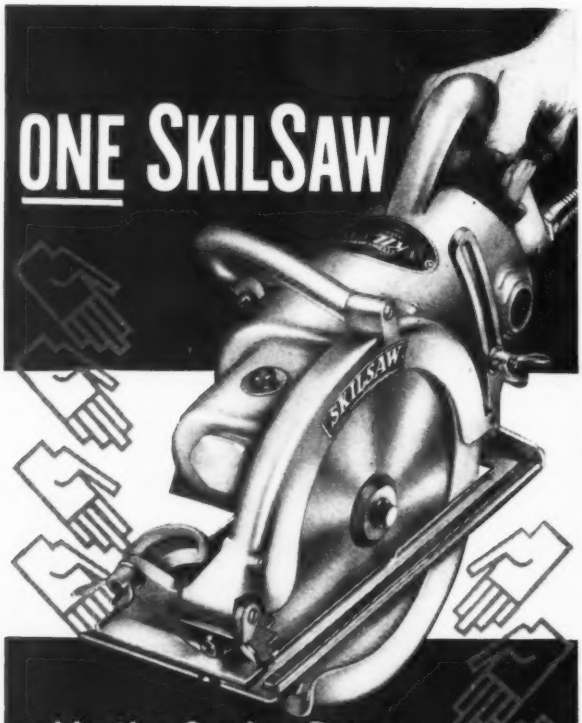


Cut axle shafts, boiler pipe, channels, angles and beams quickly and accurately. Models are available in all price ranges for either high speed production metal cutting or general all around shop work. Capacities 6" x 6" to 20" x 20". Ask for general catalog No. 12 giving description of complete Racine Saw line.

STANDARD FOR QUALITY AND PRECISION
RACINE
RACINE TOOL and MACHINE CO.

RACINE

ONE SKILSAW



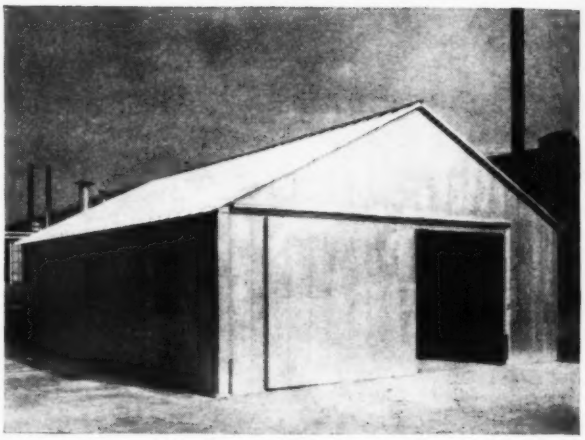
adds the Sawing Power of 10 MEN to Every Construction Gang

One portable SKILSAW does the work of 10 handsaws . . . goes right to the job, saves material handling . . . quickly makes every cut required in building or repairing bridges, trestles, platforms, stations. SKILSAWS operate from power lines, portable generators or on compressed air . . . speed every cut up to 4⅜ in. deep in wood . . . make many cuts in sheet metals and masonry products. Ask your distributor today for a demonstration.

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities

PORTABLE ELECTRIC
SKILTOOLS
MADE BY SKILSAW, INC.

4 men CAN ASSEMBLE THIS



in 10 hours!

Quick assembly is one important advantage of standard ARMCO STEELOX buildings for railroad structures. Once the foundation is in, an inexperienced crew of four men can assemble a 12′ x 24′ building in 10 hours.

This is especially important for tool houses or bunk houses along the right-of-way. Because ARMCO STEELOX buildings are "portable," they can be moved from one location to another in less than a day! STEELOX panels can be salvaged 100% and re-used many times.

BONDERIZED FOR PAINTING

Prefabricated sections of STEELOX buildings are durable. The Bonderized Galvanized PAINTGRIP surface can be painted immediately. STEELOX buildings can be quickly wired, easily insulated. Tight flanges help prevent penetration of dust, insects, or vermin. And all-steel construction is an excellent fire-barrier.

Get prices and the complete story of ARMCO STEELOX buildings by writing Armco Drainage & Metal Products, Inc., 775 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO Armco

STEELOX BUILDINGS

Creosoted { PILING POLES TIMBERS TIES

TREATED BY

McCORMICK & BAXTER CREOSOTING CO.

PORTLAND STOCKTON

M CREO-FIR B

UNIFORMITY

— A McCormick & Baxter service! Our new, large-capacity equipment, our 88 acres of storage capacity, our deep water dockage, rail sidings and our own Douglas Fir timber, mean prompt deliveries of exacting orders.

•

Call us . . .
we deliver!

McCORMICK & BAXTER CREOSOTING CO.

OFFICES:

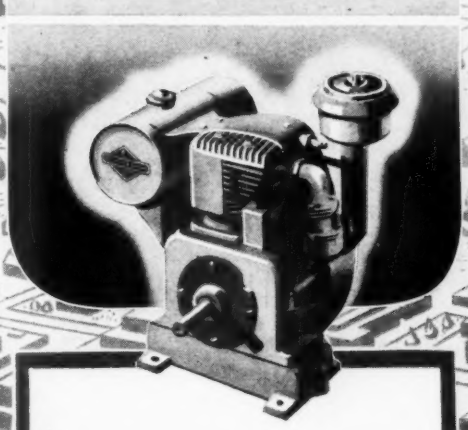
BOARD OF TRADE BLDG., PORTLAND, OREGON
485 CALIFORNIA ST., SAN FRANCISCO, CALIF.

TREATING PLANTS:

STOCKTON, CALIFORNIA • PORTLAND, OREGON

BRIGGS & STRATTON ENGINES

THE "RIGHT" POWER FOR YOUR EQUIPMENT



Manufacturers, dealers and users of gasoline powered appliances, farm machinery and industrial equipment know from experience that it pays to power with Briggs & Stratton 4-cycle, air-cooled engines.

Over two and one quarter million of these engines have demonstrated their ability to deliver dependable power under all operating conditions.

Specify Briggs & Stratton engines and you are assured of the "right power" for your equipment.

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WISCONSIN, U. S. A.

Air-Cooled Power

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

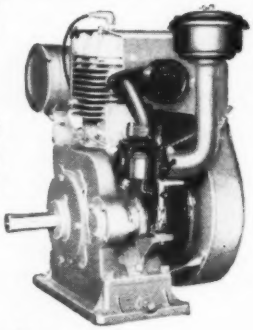
FULL HP TEST RUN
Double-Checks Power Output of All

WISCONSIN
Air-Cooled ENGINES

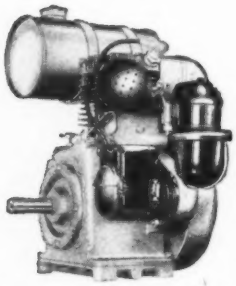
Every 4-cylinder V-type Wisconsin Engine, as well as all single cylinder engines from the smallest to the largest, are put on a 4-hour test run (the last hour under full load), working against a specially designed water brake.

This not only serves as an operating check on power output, but also provides a valuable *functional pre-test* of every working part . . . because no engine is any better than its smallest individual part, nor all of the parts working together in perfect mechanical coordination.

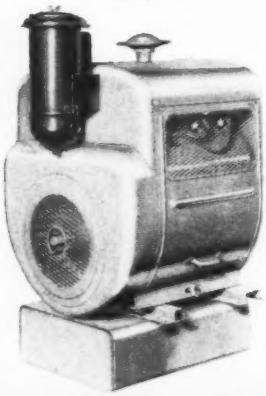
All this is important in relation to the work these engines may be called upon to do when *powering your equipment.*



This is Model ADH, AEH, AFH, AGH and AHH Wisconsin Air-Cooled Standard Engine . . . 4-cycle, single cylinder . . . rated from 3 to 9 hp. Reduction gears optional equipment on all single cyl. models.



Above is illustrated the tough little Model AA, AB, AK 4-cycle single Wisconsin Air-Cooled Standard Engine. Hp. range: 1.2 to 4 hp.



This is the Model VE4 Power Unit . . . a V-type, 4-cycle, 4-cylinder job . . . rated at 22 hp. at 2600 R.P.M. Other V-type models include the VF4 (15 to 25 hp.) and the VP4 (23 to 30 hp.). Can be supplied with clutch take-off assembly. Reduction ratios: 2:1, 3:1, 4:1.

Most H.P. per pound **WISCONSIN MOTOR** Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

Maintenance Work Done between trains

by ONE MAN and the Stanley W9 Electric Saw

One man with a W-9 Saw can make essential repairs easily and much more quickly. Cuts a full 3¼". Well-balanced for light work and plenty of power for tough jobs. Runs from a small portable generator or from any lighting circuit. Cuts every angle . . . from any angle. Gives one man the skill and capacity of a crew. Ask your Stanley distributor for a demonstration or write for literature. Stanley Electric Tools, Division of The Stanley Works, 160 Elm Street, New Britain, Connecticut.

STANLEY

Concrete by Pipe Line . . . gets it from here to there in ONE OPERATION
CONCRETE BY PIPE LINE
GETS THERE FASTER . . . MORE ECONOMICALLY . . . WITH A MINIMUM OF PREPARATORY WORK . . . ON THE MAJORITY OF CONCRETE PLACING JOBS
DID YOU KNOW?
YOU CAN TRANSPORT, ELEVATE AND PLACE CONCRETE IN ONE OPERATION
HELP...

FOR MAINTENANCE MEN!

Want information on how you can build or repair bridges, culverts, overpasses, stations, tunnels, etc., without disrupting or delaying rail traffic? Then send for your free copy of Bulletin No. 466, the informative booklet on Rex Pumpcrete . . . the pump that pumps concrete through a pipe line.

You'll find its pages cover important questions and answers . . . actual applications and results . . . mechanical data and general construction facts . . . all carefully compiled to give you the most complete information possible on Pumpcrete. It tells how you can speed up work schedules . . . how you can eliminate expensive preparatory work . . . how you can actually keep all your equipment off the right-of-way and still get the job done . . . fast.

Many major railroads, among them the Baltimore and Ohio, The New York Central, the Chicago, Milwaukee & St. Paul, The Norfolk & Western, Denver and Salt Lake, and others, are today benefiting from the ability of Pumpcrete to transport, elevate and place concrete in one operation.

Send for your free copy of Bulletin No. 466 today. There is no obligation. Address Chain Belt Company, 1601 West Bruce Street, Milwaukee 4, Wisconsin.

REX **CHAIN BELT COMPANY OF MILWAUKEE**

Don't Let Them Get *You* Down

because Stonhard products can reduce your floor and maintenance costs by as much as 50%.

HERE'S HOW . . .

Use STONHARD RESURFACER for your rutted and worn floors, platforms and trucking aisles. There's no skilled labor problem. No ripping or cutting up of the old surfaces will be necessary. Tough, yet resilient, patches or complete overlays can be applied over concrete, wood, brick or composition.

Repair or entirely resurface your old, dried-out and leaky roofs with STONHARD LIQUID and PLASTIC ROOF RESURFACERS. No laps, joints or nail holes will remain to trouble you. Because they are applied cold, there is no involved preparation of materials. Can be applied over any type of roof surface, flashings and gutters.

Help Yourself to This Opportunity

Stonhard Company will send you a TRIAL drum of these materials. If after 30 days' use and observation you are not satisfied, we will cancel our invoice.

To find out how you can save as much as 50% on your floor and roof maintenance—send in this coupon.

Stonhard Company
1323 Callowhill Street
Philadelphia 8, Pa.

Tell us how we can save on our floor and roof maintenance.

Firm.....

Mr..... Title.....

Address.....

City..... Zone..... State.....

STONHARD COMPANY

Building Maintenance Materials

Serving the Railroads, Public Utilities and Industries Since 1922

401 N. BROAD ST., PHILADELPHIA 8, PA.

SQUARE A 12x12 in 10 Seconds

with a Mall CHAIN SAW

Mall Gasoline Engine Chain Saw available in many cutting capacities.

Heavy timbers and piling used in the construction of bridges, docks, trestles and buildings can be squared to size in a few seconds with a Mall Gasoline Engine Chain Saw. Use this simple-to-operate power saw right on the job—it is easy to handle and readily portable. Has stall-proof clutch, handle throttle and automatic oiling system. Cutting chain swivels for horizontal, vertical or any angle cut. Pneumatic and Electric models are available. Also Electric Chain Sharpeners.

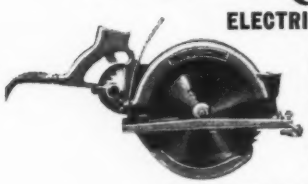
Mall 6 H. P. Off-the-Track PORTABLE RAIL GRINDER

This easily portable rail grinder will pay for itself in a short time in savings on rail and road bed maintenance, reduced shock on rolling stock, and better acting and fitting switches.

The 6 H.P. variable speed gasoline engine and heavy duty flexible shafting make the unit readily adaptable to rail joint, frog, crossing, and switch point grinding. Engine starts easily, requires little attention and uses very little fuel. Unit is ruggedly constructed for long, hard usage. Patented slip-lock detail on ends of flexible shaft and various attachments reduces tool changing to a minimum.

12-INCH Mall Saw

ELECTRIC and PNEUMATIC MODELS



A powerful saw with 12" blade for cross-cutting, ripping and beveling planks and timbers. Cutting capacity 4½" on straight cuts. Has safety guard and blower to keep cutting line clear.

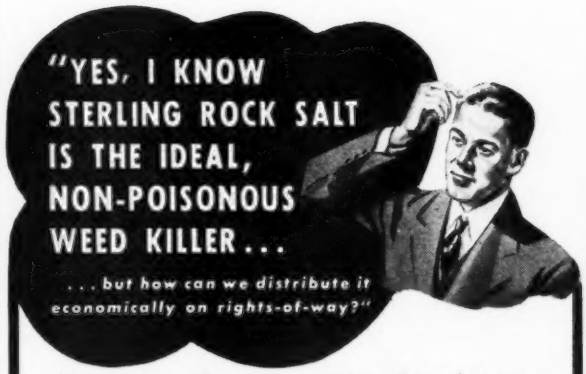
Write for Literature and Prices

RAILROAD DEPARTMENT

MALL TOOL COMPANY

7746 South Chicago Ave. Chicago 19, Illinois

**25 Years of "Better Tools for Better Work."*


"YES, I KNOW STERLING ROCK SALT IS THE IDEAL, NON-POISONOUS WEED KILLER . . .
. . . but how can we distribute it economically on rights-of-way?"

THAT'S just what we are prepared to give you and all other interested railwaymen . . . the *whole* story of Sterling Rock Salt and its economical application as a quick, reliable weed killer! Also, facts about its efficient distribution and the results it achieves . . . in keeping roadbeds *completely* free of all vegetation . . . and thus eliminating fire hazards and drainage difficulties.

So—send for detailed information on how to spread Sterling Rock Salt on your roadbeds—today! We know you will find it worth your while.

• • •

Here they are—data that show how easily and economically you can build an efficient spreader for applying Sterling Rock Salt! Get the Sterling story of *safe* elimination of weeds from rights-of-way...and the prevention of further weed growths. Data and descriptive literature are yours upon request without cost or obligation. Just fill out and send in coupon below.

International Salt Company, Inc.
Dept. REM2, Scranton, Pa.

Please send details and factual literature showing how and where Sterling Rock Salt is easily and economically applied to rights-of-way for weed elimination.

*Name*_____

*Company*_____

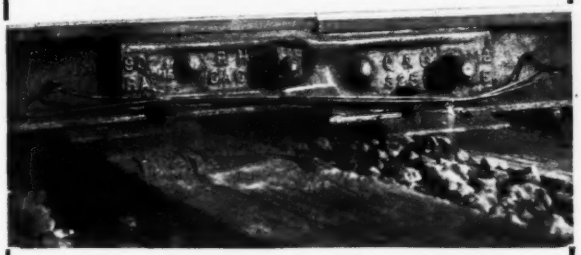
*Street*_____

*City*_____ *State*_____

Sterling ROCK SALT *Eliminates Weeds*

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

Q&C STEP JOINTS HAVE A RECORD OF DEPENDABLE SERVICE



Over a period of more than forty years, the manufacture of Q&C Step Joints has kept pace with the best practice for producing high-grade heat-treated steel compromise joints that have the necessary qualities in the steel for resistance to the impacts of heavy service.

If you will specify the correct allowance for wear on old rails, we can provide the best possible surface, to prevent batter on the rail ends and reduce your maintenance costs.

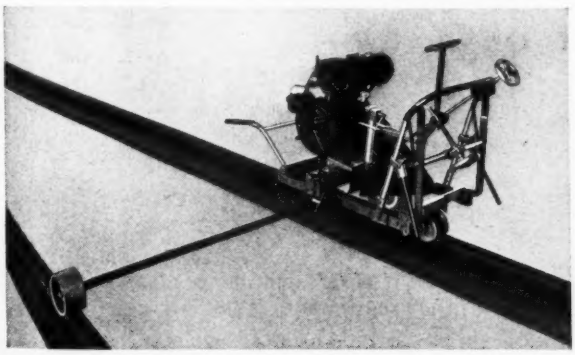
Ask for Q&C Step Joints on your requisition.

THE Q and C COMPANY

Chicago, 5. **New York, 6.** **St. Louis, 1**

Cut Rail Maintenance with Rugged RTW Track Grinders

Keep your rails, switch points, frogs, crossings, and joints in trim with accurate, efficient, easy-to-use RTW track grinders. The choice of many leading railroads RTW track grinders are available in fifteen standard models—one for every track maintenance need. Write today for latest information on the RTW line.



RTW Portable Stock Rail Grinder P-16—with flexible shaft and attachment for cross grinding of joints and extreme ends of switch points.

Railway Track-work Co.

3207 Kensington Avenue, Philadelphia 34, Pa.

872

SYNTRON

Gasoline Hammer

Combination

SPIKE DRIVERS

—

PAVING BREAKERS

and

ICE BREAKERS

100% Self-Contained
Require no air compressor and hose—no battery box and cable—no springs.

Do the Job—

EASIER—

FASTER—

CHEAPER

Write for your copy of Folder 8-45

SYNTRON CO.,

290 Lexington, Homer City, Pa.

THERE IS AN I. B. CRANE *designed* TO FIT YOUR NEEDS

Above: I. B. locomotive crane with Monitor-type cab allowing operator 360° visibility.

Left: Four motor I.B. traveling gantry electric crane. Handles 50,000 lbs. at 12 ft. radius; 10,200 lbs. at 50 ft. radius.

Materials start moving fast when Industrial Brownhoist equipment gets on the job. I.B. locomotive cranes are famous for their "stand-out" performance, dependability and economy with magnet, hook, or bucket. I.B. portal pier cranes on docks load and unload boats in a hurry. I.B. car dumpers pick up 120 ton capacity railroad coal or ore cars like toys. Regardless of your material handling problems get the engineered answer from Industrial Brownhoist.

INDUSTRIAL BROWNHOIST CORP., BAY CITY, MICH.

District Offices: New York, Philadelphia, Cleveland, Chicago • Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B.C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec.

UNIT 1020

FOR THE TOUGH JOBS

¾ YD.

New FULL VISION CAB... Engine mounted in straight line with main machinery . . . Drop-forged alloy steel gears and shafts . . . Automatic traction brakes . . . One-piece cast gear case . . . Convertible to ALL attachments... Low cost.

UNIT 1020
¾ Yard Shovel

UNIT 1020
10 Ton Crane

UNIT 1020
¾ Yard Dragline

UNIT CRANE & SHOVEL CORP. MILWAUKEE 14, WIS., U. S. A.

CONTACT FACTORY DIRECT
FOR PRICE AND DELIVERY

A 4909-¼

WANTED

ASSOCIATE EDITOR

A man with technical training and some experience in the engineering or maintenance of way department of a steam railway, preferably in both departments. Must demonstrate his ability to write English clearly and concisely. Editorial experience unnecessary. Headquarters Chicago or New York. This position has a future for the right man. Address Railway Engineering and Maintenance, 105 W. Adams St., Chicago 3, Ill.

Electricity

FOR RAILROAD WORK
Anywhere!

Models range from 350 to 35,000 watts, A. C. types from 115 to 660 volts, 50, 60, 180 cycles, single or three-phase and 400, 500 and 800 cycles, single phase. D. C. types from 6 to 4000 volts. Also available in dual voltage and special frequency types.

Onan

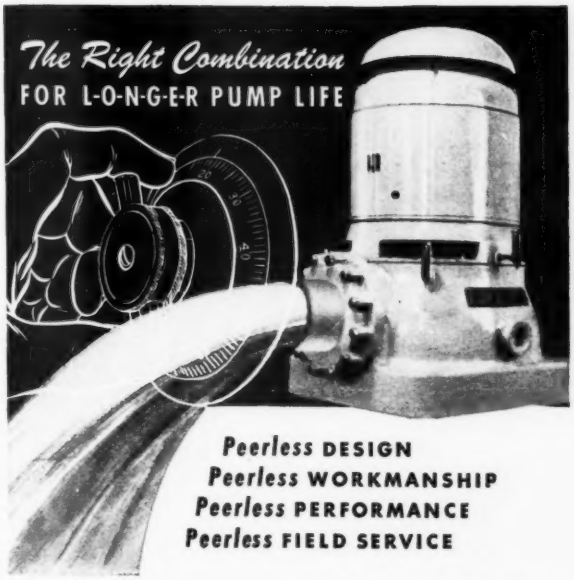
Onan Electric Generating Plants provide sure, on-the-spot electric power to meet many situations and applications in the Railroad Industry. Indispensable for maintenance work, signal systems, service and general lighting, repair shops, emergencies and other uses.

Driven by Onan-built, 4-cycle gasoline engines, these power plants are of single-unit, compact design and sturdy construction. They are suitable for intermittent or heavy duty, continuous service.

Model shown is from W2C series; 2000 to 3500 watts; powered by Onan-built, two-cylinder, water-cooled engine.

D. W. ONAN & SONS
4410 Royalston Ave.
Minneapolis 5, Minn.

Write For Folder 690-A describing complete Onan Line



Peerless manufactures a complete line of Deep Well Turbine Pumps, Domestic Water Systems, and Horizontal Centrifugal Pumps (formerly Dayton-Dowd).

PEERLESS PUMPS

PEERLESS PUMP DIVISION
Food Machinery Corp.

VERTICAL & HORIZONTAL

FACTORIES
LOS ANGELES 31, CALIFORNIA
301 West Avenue Twenty-six
QUINCY, ILL. • CANTON 6, OHIO

SEALTITE
ESSENTIAL PRODUCTS

***Double-Life* FINISH—Sealed in Zinc**—Actual service tests reveal distinct economies are effected by specifying Sealtite Essential Products with Double-Life Hot-Dipped, sealed in zinc finish. Corrosion is retarded—the fasteners have much longer life and expensive replacements are eliminated. Protect your investment—*specify* Hot-Dipped Galvanized—Sealed in zinc.

LEWIS BOLT & NUT CO.
MINNEAPOLIS, MINNESOTA

***Serving 72%* OF AMERICA'S CLASS I RAILWAYS**

THIS NEW 20-Page illustrated booklet shows you how 72 roads have improved their timber structures with TECO Connectors.
Fill in coupon for your FREE *copy.*

"TECO CONNECTORS FOR TIMBER CONSTRUCTION in RAILROAD SERVICE"

TIMBER ENGINEERING COMPANY 1319 18th STREET, N.-W. WASHINGTON 6, D. C.

Please mail my free copy—no obligation on my part.

NAME.....

COMPANY.....

ADDRESS.....

AIR PLUS JAEGER COMPRESSOR

on thousands of jobs, Jaeger Compressors are delivering MORE air with LESS fuel

Sizes 60 to 500 ft.

Let us show you how these big-valved compressors, built like aircraft engines, are out-performing prewar type machines. Ask for Catalog JC-5.

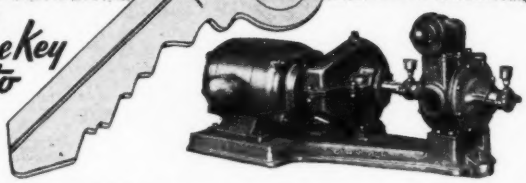
THE JAEGER MACHINE CO. Main Office, Factory Columbus, Ohio

REGIONAL OFFICES: 8 E. 48th St. NEW YORK 17, N. Y. 226 N. LaSalle St. CHICAGO 1, ILL. 235-38 Martin Bldg. BIRMINGHAM 1, ALA.

PUMPS • MIXERS • LOADERS • HOISTS • PAVING MACHINERY

BLACKMER PUMPS

The Key to



- LOWER PUMPING COSTS
- SUSTAINED PUMPING CAPACITY
- PUMP DEPENDABILITY

Write for Bulletin No. 307— FACTS ABOUT ROTARY PUMPS

which explains why the "Bucket Design" (swinging vane principle) maintains pumping capacity by automatically compensating for wear, and how the buckets, when finally worn out, are easily replaced and the pump restored to its normal capacity.

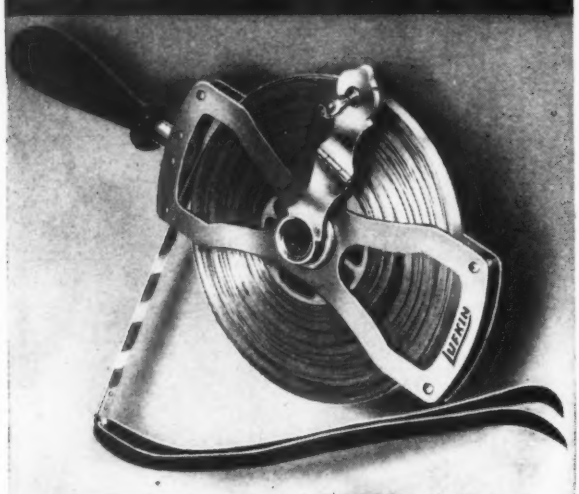
BLACKMER PUMP COMPANY

2140 Century Avenue Grand Rapids 9, Michigan

Refueling Units for Diesel Locomotives

POWER PUMPS • HAND PUMPS • EZY-KLEEN STRAINERS •

LUFKIN "MICHIGAN" CHAIN TAPES



You railroad engineers should have a man's tape that will stand up under hard use. That's why you'll like the "Michigan"—America's sturdiest Babbitt metal tape. Extra tough steel line. Markings deeply stamped in Babbitt metal. Write for free catalog.

LUFKIN

SAGINAW, MICHIGAN · NEW YORK CITY

TAPES · RULES · PRECISION TOOLS

HANDLE REPAIR LOADS Once!

Eliminate repeated handling of the same loads! KRANE KAR picks up, transports, and positions the load. No need to maneuver the vehicle . . . operate the "live" boom from side to side and up or down, by power, with full load on the hook. Automatic load and boom braking, stability without jacks or outriggers, and other advanced features make KRANE KAR surprisingly easy to handle. Ups production in the locomotive, car, and wheel repair shops. Agents in principal cities. Write for Catalog No. 58.

USERS: AT&SF, CB&Q, BIG FOUR, B & O, PRR, CP, ETC.

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

FOR RAILROADS

SILENT HOIST & CRANE CO., 884 63rd ST., BKLYN 20, N.Y.

The Demand is Steadily Mounting!

Because It's JUSTRITE

In the yards, the shops, the roundhouse—in all the branches of railroading—the demand for this Justrite Portable Twin-Bulb Safety Lantern (Model No. 44-S) is steadily mounting. Railroad men know this lantern has proven itself, over and over again, as tops for rugged, reliable service. This fine all-purpose electric lantern has "kick-out" bulb sockets that immediately eject broken bulb, breaking the circuit in socket. Body of lantern swings on central pivot—beam can be focussed at any angle desired. Movable guard base and adjustable handle. Fixed sparkproofed guard. Approved by Underwriters' Laboratories, Inc., and U. S. Bureau of Mines.

See your supplier or write for details.

JUSTRITE MANUFACTURING COMPANY

2063 Southport Ave. • Dept. D-7 • Chicago 14, Ill.

Simplex Track Shifters Save a Lot of Man Hours!

No matter what your track lining job is, the Simplex Track Shifter will do it more economically. Powered by your track jacks and used in sets of two, this new method of lining requires minimum manpower. Ideal for lining any weight track in any type ballast; for lining swings, sharp and flat curves, turnouts, crossovers and ladder tracks. Write for Bulletin TS-45.

Simplex Track Shifter. Travel 6".

Templeton, Kenly & Co.,
Chicago (44), Ill.
Better, Safer Jacks Since 1899

SIMPLEX
WORLD'S MOST COMPLETE LINE OF
JACKS
LEVER
SCREW
HYDRAULIC

FITZGERALD GASKETS

SINCE 1906

THE COMPLETE LINE THAT COMPLETELY SATISFIES

for All Railway Purposes

Gasket Craftsmen for 40 Years

Write for information

• • • • •

The Fitzgerald Manufacturing Company

Torrington, Conn.

Branches: Chicago, Ill. — Los Angeles, Cal.
Canadian FITZGERALD Limited, Toronto

TOUGH OVERLAYS AND PATCHES FOR Concrete or Wood Floors

Resurface or patch broken concrete floors with tough RUGGEDWEAR resurfacer. Here's a material which will stand up under the most punishing traffic conditions. Simple to install—no chopping or chipping required. Merely sweep out the spot to be repaired—mix the material—trowel it on. Holds solid and tight right up to irregular edge of old concrete. Provides a firmer, tougher, smoother, more rugged wearing surface. Used indoors or out. Dries fast.

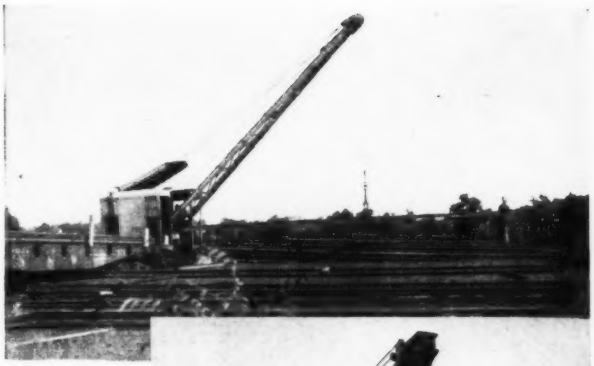
MAIL COUPON for FREE TRIAL OFFER

FLEXROCK COMPANY
3647 Filbert St., Philadelphia 4, Pa.

Please send me complete RUGGEDWEAR information and details of FREE TRIAL OFFER—no obligation.

Name .....
Company .....
Address .....

MORE ECONOMIES
with
BURRO CRANES



The all-around working utility of Burro Cranes makes them cost-cutters on every maintenance-of-way or yard job they handle. Equally efficient with bucket, hook, rail tongs, magnet or dragline, Burro Cranes are responsible for more economies in routine and special maintenance or materials handling jobs because they are designed for the work—not adapted to it.

The many working features of Burro Cranes—short tail swing, fast travel speeds, draw bar pull of 7500 lbs., elevated boom heels, low overall height and independent friction clutches make them the busiest, most efficient crane of their type. Cullen-Friestedt Co., 1301 S. Kilbourn Ave., Chicago 23, Ill.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

ALPHABETICAL INDEX TO ADVERTISERS, FEBRUARY, 1946

A

Air Reduction Sales Co. 116-117
American Brake Shoe Co. 152
American Hoist & Derrick Co. 124
American Zinc Institute 108
Armco Drainage & Metal Products, Inc. 146-196
Athey Products Corporation 137

B

Barco Manufacturing Company 138
Bethlehem Steel Company 105
Blackmer Pump Company 204
Briggs & Stratton Corp. 197
Buda Company, The 139

C

Caterpillar Tractor Co. 144-145
Chain Belt Company 199
Chipman Chemical Company, Inc. 110
Cletrac Division of Oliver Corporation 135
Colorado Fuel and Iron Corporation, The 142
Cullen-Friestedt Co. 206

D

Douglas Fir Plywood Association 140
Du Pont de Nemours & Co., Inc., E. I. 106
Dura-Tred Company 192

E

Eaton Manufacturing Company 104
Electric Tamper & Equipment Co. 113

F

Fairbanks, Morse & Co. 141
Fairmont Railway Motors, Inc. 150
Fitzgerald Manufacturing Company, The 205
Flexrock Company 205
Food Machinery Corp. 203

G

General Chemical Company 114
Gorman-Rupp Company, The 112

H

Homelite Corporation 125

I

Independent Pneumatic Tool Company 111
Industrial Brownhoist Corp. 202
Ingersoll-Rand 131
International Salt Company, Inc. 200

J

Jaeger Machine Co., The 204
Jordan Company, O. F. 194
Justrite Manufacturing Company 205

K

Koppers Company, Inc. 127

L

Layne & Bowler, Inc. 195
Lewis Bolt & Nut Co. 203
Lufkin Rule Co., The 204

M

Mall Tool Company 200
McCormick & Baxter Creosoting Co. 197
Michigan Power Shovel Company 122

N

National Lead Company 133
National Lock Washer Company, The 103
Nordberg Mfg. Co. 128
Northwest Engineering Co. 109

O

Oliver Corporation 135
Oliver Iron and Steel Corporation 118
Onan & Sons, D. W. 203
Orton Crane & Shovel Co. 119
Oxweld Railroad Service Company, The 129

P

P. & M. Co., The 207
Peerless Pump Division 203
Pettibone Mulliken Corporation 115
Pittsburgh Pipe Cleaner Company 132

Q

Q and C Company, The 201

R

Racine Tool and Machine Co. 195
Rail Joint Company, Inc., The 120-121
Railroad Accessories Corporation 149
Railway Maintenance Corp. 143
Railway Track-work Co. 201
Ramapo Ajax Division 152
Reade Manufacturing Company 134
Reconstruction Finance Corporation 130
Reliance Division 104

S

Schramm, Inc. 191
Simmons-Boardman Publ. Corp. 202
Silent Hoist & Crane Co. 204
Skilsaw, Inc. 196
Snow Construction Co., T. W. 126
Stanley Electric Tools 198
Stonhard Company 199
Syntron Co. 201

T

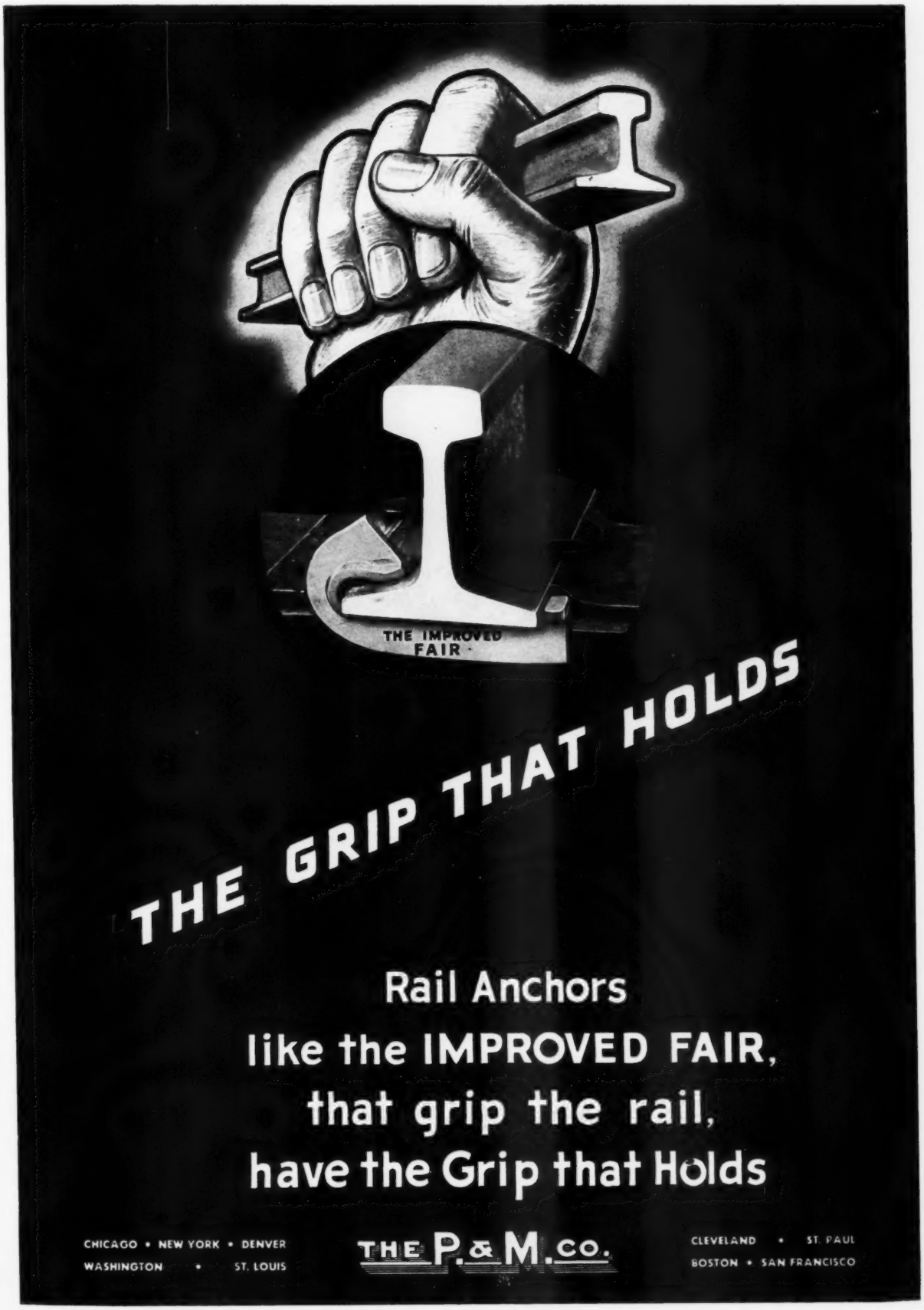
Templeton, Kenly & Co. 205
Timber Engineering Company 203
Timken Roller Bearing Company, The 123

U

Union Carbide and Carbon Corporation 129
Union Metal Manufacturing Company, The 189
Unit Crane & Shovel Corp. 202

W

Warren Tool Corporation 107
Weir Kilby Corporation 193
Williams & Co., J. H. 147
Wisconsin Motor Corporation 198
Wood Preserving Division 127
Woolery Machine Company 136
Worthington Pump and Machinery Corporation 208


THE IMPROVED
FAIR
THE GRIP THAT HOLDS
Rail Anchors
like the IMPROVED FAIR,
that grip the rail,
have the Grip that Holds
CHICAGO • NEW YORK • DENVER
WASHINGTON • ST. LOUIS
THE P. & M. CO.
CLEVELAND • ST. PAUL
BOSTON • SAN FRANCISCO

EASING THE PRESSURE ON REPAIRS

Blue Brute Track Teams are helping hard-pressed maintenance men to keep up with the demands for reconstruction and repairs occasioned by the heavy travel of the war years.

Speed, stamina and teamwork stand out in every Blue Brute detail. For example, the Blue Brute Hand-I-Air Compressor... so light two men can handle it... delivers 60 cu. ft. a minute, smoothly and economically, through light, tight, fool-proof Feather* Valves, to four WTT-7 Tie Tampers with leak-proof throttles.

No other tamper fills voids under ties so fast. No other rugged, powerful tamper weighs so little... only 42 lbs. Such efficient Blue Brute teamwork adds up to more lineal feet per day in finished surfacing.

Other Blue Brute Track Teams, made up of portable gasoline, Diesel or electric-driven compressors and Blue Brute rock drills and air tools, also make less air do more work... with less time out for repairs. Investigate them now!

You'll find that *there's more worth in Worthington.*

*Reg. U. S. Pat. Off.

HS-9A

Get more **WORTH** *from air with* **WORTHINGTON**

BUY BLUE BRUTES

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division Holyoke, Mass.